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Great Lakes Basin Commission, Ann Arbor, MI

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This report presents a United States/Canada joint summary and comparative review of detailed separate studies of legislative, regulatory and administrative programs which address the control of pollution from land use activities. Principal agencies and levels of government with roles in each of nine land use categories identified by PLUARG are discussed. The effectiveness of programs intended to prevent water pollution from land use activities is evaluated.

Discussions of each land use activity include a summary description of the institutional framework relevant to it.

Discussion of several policy issues provided the basis for general conclusions: separation of agency authority for development planning and water pollution control may inhibit the effectiveness of nonpoint controls; traditional enforcement process for point source pollution control may be inadequate for extension to control of nonpoint sources; the public's advocacy role in administrative processes is important.

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CONTROL OF WATER POLLUTION FROM LAND USE ACTIVITIES IN THE GREAT LAKES BASIN:

AN EVALUATION OF LEGISLATIVE AND ADMINISTRATIVE PROGRAMS IN CANADA AND THE UNITED STATES

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JOINT SUMMARY REPORT

CONTROL OF WATER POLLUTION
FROM
LAND USE ACTIVITIES
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GREAT LAKES BASIN:
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IN CANADA AND THE UNITED STATES

Submitted to the
INTERNATIONAL REFERENCE GROUP
ON GREAT LAKES POLLUTION FROM LAND USE ACTIVITIES
INTERNATIONAL JOINT COMMISSION

MARCH 1978

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DISCLAIMER

Findings and conclusions are those of the authors and do not necessarily reflect the views of the States, the Province of Ontario, the Federal governments or the views of the Reference Group and its recommendations to the International Joint Commission.

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CANADA

Castrilli, J.F., Control of Water Pollution from Land Use Activities in the Canadian Great Lakes Basin: An Evaluation of Legislative, Regulatory and Administrative Programs, Prepared for Fisheries and Environment Canada and International Reference Group on Great Lakes Pollution from Land Use Activities, International Joint Commission, on behalf of the Canadian Environmental Law Research Foundation, Toronto, Ontario, 1977.

UNITED STATES

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- Comparative Analysis (December 1977)
- Federal Institutional Structure (December 1977)
- Illinois Institutional Structure (November 1977)
- Indiana Institutional Structure (October 1977)
- Michigan Institutional Structure (November 1977)
- Minnesota Institutional Structure (November 1977)
- New York Institutional Structure (October 1977)
- Ohio Institutional Structure (October 1977)
- Pennsylvania Institutional Structure (November 1977)
- Wisconsin Institutional Structure (September 1977)

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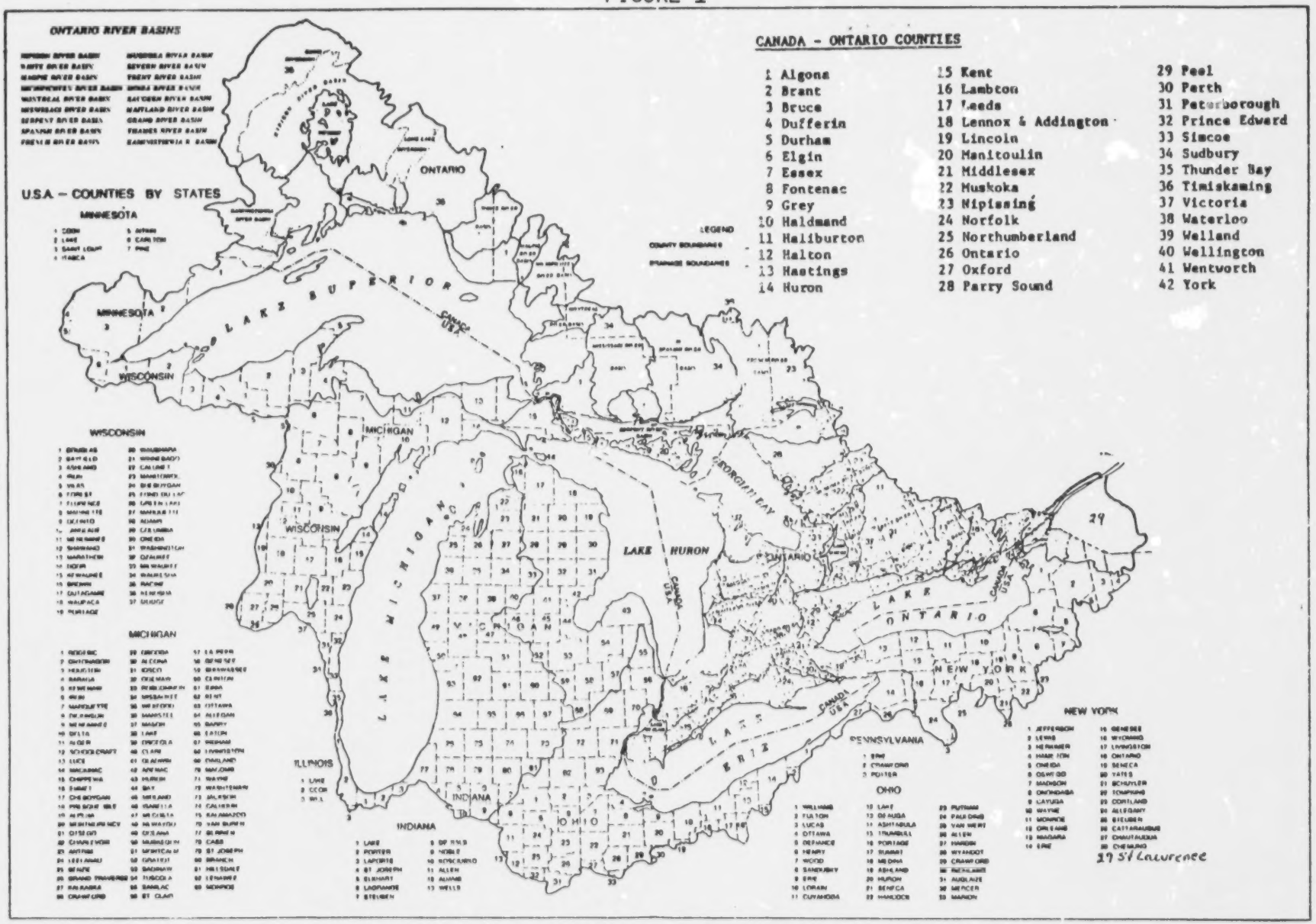

GREAT LAKES BASIN DRAINAGE AND POLITICAL DIVISIONS

EXECUTIVE SUMMARY

This report presents a joint summary and comparative review of detailed separate studies carried out in Canada and in the United States of legislative, regulatory and administrative programs which address the control of pollution from land use activities. Principal agencies and levels of government with roles in each of nine land use categories identified by PLUARG are discussed. Comparative observations have been made with respect to the effectiveness of programs intended to prevent water pollution from land use activities.

Section 2 of this report contains a discussion of each land use activity. The first part of each of these land use discussions presents a summary description of the institutional framework relevant to that activity. The observations which comprise the second part of each are evaluative comments based on the background studies.

Section 3 contains a discussion of several policy issues which either have general relevance to the study though not to any one category or have special importance to several land use activities. These issues are the basis for the following general conclusions of the comparative review:

- The separation of agency authority for development planning and water pollution control may inhibit the effectiveness of nonpoint controls.
- PL 92-500, which provides for integration of planning with pollution control may not impose an enforceable legal duty to implement an adequate plan under Section 208.
- Environmental assessment law may not be an effective substitute for sediment control law.
- The traditional enforcement process for point source pollution control may be inadequate for extension to control of nonpoint sources.
- Intensified voluntary efforts may not be sufficient to adequately control nonpoint source urban and agricultural pollution.
- The importance of an advocacy role for the public in the administrative process should be recognized.

In general, legislation respecting state water quality standards and provincial impairment prohibitions is sufficiently broad to prohibit pollution from diffuse or nonpoint pollution.

However, in both the U.S. and Canada permits, licences or approvals (preventive controls) are frequently not required for many of the land uses under consideration (e.g. agricultural drainage schemes, many feedlot operations, application of fertilizers, transportation corridors generally, dredging). Thus reliance is often placed on voluntary codes, in-house administrative procedures and non-environmental statutes in lieu of preventive environmental legislation. This general approach to nonpoint source pollution control can result in gaps in control effectiveness and unsystematic - if not arbitrary - abatement and enforcement.

Recent environmental assessment legislation in Ontario and several Basin states may have some positive influence in reversing this situation, though their effective application to the myriad small, proposed and on-going, land disturbing activities is doubtful.

In the context of new urban development in Ontario, development planning legislation is the principal control instrument. However, the separation of development planning and water pollution control functions can only be bridged where there is great cooperation between agencies responsible for these two mandates. Frequently, effective nonpoint source control is difficult to obtain because of this institutional separation of functions. In the U.S. the Areawide Water Quality Management Planning process (under Section 208 of PL 92-500) is the principal mechanism being used to link planning and pollution control functions. This process applies to issues beyond the scope of new urban development since rural nonpoint sources are considered as well. Unfortunately, under the 208 planning process for designated areas the agencies responsible for pollution control are not directly engaged in managing the planning programs. For example, councils of government or regional planning commissions do not have the authority to implement their proposed plans and must depend upon support of and action by local units of government. Even in non-designated planning areas, where the planning is carried out by state agencies, responsibility for action to control many sources of nonpoint pollution rests with independent local governments. U.S. EPA is not in a position to implement adopted 208 plans both by the terms of 92-500 and, arguably, due to constitutional limitations. Effective sanctions which could compel enforcement of a 208 plan appear to be absent. Thus, while planning and pollution control have been linked, the fruits of such a linkage are dependent on exceptional intergovernmental cooperation.

Land use activities such as extractive operations and solid waste disposal are dealt with through preventive environmental legislation, (e.g. permits or approvals) as a matter of course. However, a variety of factors, both external and internal to the responsible agencies, appear to influence regulatory effectiveness in these areas. For example, increasing waste generation forecloses certain approval and enforcement options, staff resources are limited, policies often conflict, and provisions for abandoned operations generally have not been made.

Use of fiscal tools in the U.S. and in Canada has both positive and negative results. For example, federal and state/provincial opportunities exist

to fiscally stimulate nonpoint source controls as a condition for funding housing development. Resource recovery efforts hold promise of positively, though indirectly, aiding water quality in the future by reducing the need for solid waste disposal sites. On the other hand, in Canada federal/provincial agreements for fiscally stimulating agricultural soil conservation have generally been permitted to lapse. In the U.S. though a program has been underway for many years to promote soil conservation among individual farmers, much of the money has been spent to support production-oriented practices. 1977 Amendments to the Clean Water Act now provide a cost-share program to encourage farmers to adopt management practices specifically aimed at protection of water quality. The extent to which this program will be utilized and its effectiveness cannot yet be evaluated.

1. INTRODUCTION

BACKGROUND

On April 15, 1972, the governments of Canada and the United States signed the Great Lakes Water Quality Agreement. As an integral part of this agreement, the International Joint Commission was asked to establish a Reference Group to study pollution in the Great Lakes system from agriculture, forestry and other land use activities.

Subsequently, the Pollution from Land Use Activities Reference Group was formed with an equal number of Canadian and United States members to answer the following three questions:

(1) Are the boundary waters of the Great Lakes System being polluted by land drainage (including ground and surface runoff and sediments) from agriculture, forestry, urban and industrial land development, recreational and park land development, utility and transportation systems and natural sources?

(2) If the answer to the foregoing question is in the affirmative, to what extent, by what causes, and in what localities is the pollution taking place?

(3) If the Commission should find that pollution of the character just referred to is taking place, what remedial measures would, in its judgement, be most practicable; and what would be the probable cost thereof?

In order to provide an adequate response to this last question, the Reference Group proposed a series of studies to define all those remedial measures pertinent to the solution of the problem areas identified.

This study is specifically addressed to the review and the evaluation of the existing legislative and institutional framework applicable to control of pollution from land use activities.

Canada and the United States have both undertaken this study by gathering information on the following tasks:

(1) The content of the existing institutional framework available at each level of government (Federal, Provincial, State, Special Purpose District, County and Municipal) for controlling the nonpoint discharges of sediments, nutrients, pesticides, and chemicals associated with the land use categories listed in Table 1. Special reference has been made to the provisions at the local level for control of these potential diffuse sources of pollution.

(2) The extent of the regulatory power, the commitment to develop and undertake programs and the degree of enforcement practiced at each of the specified levels of government relative to pollution from land use activities.

(3) Other relevant government and non-governmental programs and policies which have an indirect bearing on the control of pollution from land use activities.

(4) The land use categories for which the four major pollutants (sediments, nutrients, pesticides and chemicals) are least controlled.

(5) Alternatives for future action available to each level of government within the constitutional framework of both countries.

PURPOSE AND ORGANIZATION

This report presents a joint summary and comparative review of the conclusions of the background studies carried out in the United States and Canada. Of necessity, this report can only highlight key findings and draw attention to major issues. For full documentation of points made here the reader is referred to the background reports published separately for each country. In addition to presenting a concise statement of conclusions this joint summary also provides a discussion of several issues relevant to both the U.S. and Canada.

Section 2 of this report presents a summary of the institutional framework relevant to each of the nine categories of land use activity identified originally by the Reference Group. Discussion of each of these categories has been organized so as to be self-contained. That is, all the institutional information relevant to a land use activity/ category is presented for both Canada and the U.S. in that section. Observations and where possible trends have been organized as a comparative analysis and are therefore not separated for each country.

Section 3 contains a discussion of several policy issues which either have general relevance to the study but not to any one category or have special importance due to their relationship to several land use activities. Discussion of policy issues also introduces an important lateral dimension to the institutional findings in Section 2 which might not otherwise be revealed by a land use by land use review.

DEFINITIONS AND METHODOLOGY

The land use categories examined in this study are those that PLUARG has found may cause nonpoint pollution. Table 1 summarizes the major activities associated with each category and identifies the primary contaminants likely to result from each.

TABLE 1

LAND USE CATEGORIES, ACTIVITIES AND POTENTIAL CONTAMINANTS TO THE GREAT LAKES SYSTEM

LAND USE CATEGORY	LAND USE ACTIVITY	CONTAMINANT TYPE
1. Urban Areas	- residential, commercial and industrial construction site runoff - stormwater runoff	- sediments, chemicals, nutrients and pesticides
2. Agriculture	- application of pesticides - application of fertilizers - feedlot operations/animal wastes - erosion from general farm practices - drainage	- sediments, nutrients, chemicals, pesticides
3. Liquid, Solid and Deepwell Disposal Areas	- solid wastes from residential, industrial, and institutional sources - liquid sewage sludges - private sewage disposal systems - liquid industrial wastes	- primarily leachates from disposal sites, and chemicals
4. Shoreline Landfilling	- land or construction excavations - dredging activities	- primarily sediments and chemicals
5. Transportation Corridors	- runoff from construction use and maintenance of - highways and roads - railroads - airports - pipelines - hydro rights-of-way	- primarily sediments, chemicals pesticides
6. Extractive Operations	- pits and quarries - mining - brines requiring disposal from oil and gas operations	- primarily sediments and chemicals
7. Forested Areas	- timber production (including cutting operations, and construction, maintenance and use of roads) - woodland grazing - wildlife management - recreation (i.e. construction, maintenance and/or protection of recreation sites, forest roads and trails)	- primarily sediments nutrients and pesticides
8. Recreational Areas	- hiking - skiing - snowmobiling - riding - all-terrain vehicle use - pesticide use - private waste disposal systems associated with vacation homes	- primarily sediments, nutrients, pesticides and chemicals
9. Lakeshore and Riverbank Erosion		- primarily sediments

Control of land use activity is exercised to different degrees through a wide variety of programs. To facilitate the analysis, six different levels of control were identified. These levels are applied in different combinations for different land use activities.

-Pollution Control includes the control of specific projects or activities through legislation or regulations by Preventive or Reactive means. Preventive control includes a situation where a proposed or continuing activity must receive an approval, permit or licence etc. from a designated agency prior to project implementation, or at periodic intervals. Reactive control includes a situation where an activity may proceed without prior approval, but is subject to control retroactively if pollution prohibitions or standards are violated. An example of a preventive control would be a certificate of approval prior to the establishment of a waste disposal site. An example of a reactive control would be a prosecution and fine for a fish kill from a feedlot operation.

-Planning includes a situation where a plan of a specific activity must be submitted prior to implementation of the activity, or where a municipal/regional government or the state/province develops a general or specific plan, which must be followed in approving and/or implementing subsequent specific activities. Examples, would include a subdivision plan showing the stormwater and site runoff control measures to be employed during and after development and an official land use plan for a local area showing where, and what type of activities may be undertaken within the planning area.

-Fiscal activity includes loans, grants, subsidies, taxing incentives or other funding measures or monetary assistance from a public agency to individuals, the private sector or groups or to other government levels or agencies to assist in improving or stimulating pollution abatement.

-Proprietary or Management responsibility for public lands, property or facilities. This includes the guidelines adopted by a public agency on how it will maintain such lands, property or facilities, as well as how it views its responsibilities in relation to the controls of other public agencies. An example would be a harbour commission's expansion plans and practices and its response to municipal/regional environmental planning and sensitive area designations or constraints. A further example would be the rules adopted by an agency responsible for operation of state park facilities pertaining to control of recreational activity.

-Other Statutory Control includes an Act or regulation that has been implemented for another major purpose, but will have an indirect impact on environmental control. An example, would be environmental constraints arising out of pipeline legislation.

-Non-Statutory Control includes programs, codes, guidelines that are not in direct response to a legislative mandate, but which are designed to reduce pollution. This includes educational and technical assistance programs and in-house administrative procedures. An example would be the voluntary Agricultural Code of Practice program or the federal Environmental Assessment and Review Process.

The procedure used in preparing this report has been to identify and evaluate the existing legislative institutional framework with respect to each of the nine land use categories recognizing the various levels of control utilized. Based on these descriptions, trends for each activity were identified. Observations pertaining to both contrasting and parallel experiences were made with an emphasis on conclusions which suggest alternatives for the future evaluation of the legislative regulatory framework.

SIMILARITIES AND DIFFERENCES IN THE POLITICAL SYSTEMS IN CANADA AND THE UNITED STATES

Control approaches to pollution problems in both Canada and the U.S. are in part a reflection of differing constitutional development as well as traditional notions of which institutions are best equipped for day-to-day decision-making in areas broadly affecting the public welfare.

In Canada, the British North America Act of 1867, though not explicitly addressing water quality/land use matters, distributes the basis for legislative control over water pollution and land use between the provincial and federal levels of government.

The enumerated powers of the federal government include jurisdiction over navigation and shipping, certain harbours and canals, the public debt and federal property, lands reserved for Indians, fisheries, works declared by Parliament to be for the general advantage of Canada (e.g. nuclear facilities), interprovincial works and undertakings such as railways, trade and commerce, defense establishments, the criminal law and under a residual clause, competence to enact legislation for the "peace, order and good government" of Canada in relation to all matters not coming within the subjects assigned exclusively to the provinces.

The enumerated powers of the provincial government include property and civil rights matters of a merely local or private nature, local works and undertakings (pertaining to transportation and related systems), municipal institutions, the management and sale of public lands and, natural resources.

Both levels of government may legislate with respect to agriculture.

The allocation of legislative powers gives the province the principal authority and scope for land use and water pollution control, which has generally been upheld in the courts. However, federal authority for several matters (e.g. navigation and shipping, fisheries, certain harbours and transportation matters such as airports, pipelines and railways of an interprovincial nature) makes it evident that land use water quality decision-making can be influenced by federal responsibilities.

In the United States the Constitution defines the powers which may be exercised by the federal government and establishes the basis for the relationship between the federal government and the states. Those powers not specifically delegated to the United States nor prohibited to the states are reserved to the states or to the people.

Article I Section 10 places certain specific limitations on the states so as to provide centralized authority in the federal government. Article VI, Section 2 provides that the treaties and statutes of the United States are the supreme law of the land and must be observed by judicial officers of the states. Article IV, Section 3 provides Congress the authority to make all needed rules and regulations respecting the territories and other property belonging to the United States.

The authorization for all environmental pollution control programs at the federal level is derived primarily from the Commerce Clause of the Constitution (Article I Section 8). Under this section it is generally held that the federal government may regulate activity affecting all of the surface waters of the United States at least for the purposes of pollution control.

The states may regulate water pollution and land use under their authority to exercise the police power. Although the precise definition of police power differs from state to state as a function of a state's constitution and judicial decisions, it is generally held that legislation which regulates human activity in a fashion reasonably necessary to protect the public health, safety and welfare is an appropriate use of legislative responsibility by a state government.

One factor generally agreed upon* is that Canadian legislation grants greater discretion to administrative agencies than its American counterpart. Ontario, for example, relies on non-statutory guidelines rather than codified regulations respecting water quality. This less structured approach is perceived as consistent with traditional English/Canadian views that administrators charged with regulatory authority require sufficient flexibility in meeting a myriad of local problems and conditions.

*J. Neil Mulvaney, Director, Legal Services Branch, Ontario Ministry of the Environment. "Canadian Pollution Control Law - The Great Lakes". International Joint Commission, Great Lakes Research Advisory Board Workshop on Economic and Legal Enforcement Mechanisms. February 1977.

2. INSTITUTIONAL FINDINGS BY LAND USE

URBAN AREAS

CONSTRUCTION SITE RUNOFF

OVERVIEW

Within the Great Lakes Basin, there is no direct Canadian or U.S. federal involvement in control of erosion and sedimentation from new urban development on non-federal lands. Fledgling initiatives have been attempted in a number of municipalities to control construction site runoff. In two state jurisdictions statewide programs directed specifically at erosion and sedimentation control have precipitated more widespread local action in this area. In Ontario similar initiatives have taken place mainly under development planning legislation.

CANADA

Federal

The Central Mortgage and Housing Corporation (CMHC) under the National Housing Act (NHA) provides mortgage monies and financially encourages development of land assemblies and new communities. The NHA is silent on water pollution matters except under Part VIII where it provides loans for sewage treatment plant and trunk storm sewer construction to minimize "soil and water pollution" (i.e., principally point sources). Requiring appropriate sediment and erosion control by recipients of mortgage loans land assembly/new communities funds is not being considered by CMHC. CMHC's funding of such development without its providing financial support for diffuse source controls may result in nonpoint pollution problems.

Ontario

The Planning Act, administered by the Ministry of Housing, is a development planning statute with sufficient powers of a broad general nature to deal with nonpoint source problems from new urban development. The Act authorizes local official land use plan development, zoning, subdivision and redevelopment controls and related matters. It should be noted that planning in Ontario, unlike that in the Basin states, is carried out at the municipal level subject to provincial, and in some cases regional government, overview. Thus, the various planning instruments described above either require approval by the Minister of Housing or the Ontario Municipal Board - the province's planning tribunal - or are open to appeal to one of them, before they go into effect. (In some cases, such as subdivision agreements, appeal may only be made by the

developer). The Act does not create a duty to protect water quality from such land development activities. Silt and stormwater controls have been adopted in a number of municipal subdivision agreements. Experience has been mixed. Provincial environmental agencies and local Conservation Authorities, with some exceptions, have mainly an advisory role in this area, unless a Ministry of Housing condition of draft plan approval gives them greater authority. Conservation Authorities have permit authority under their regulations, for construction that takes place in a mapped floodplain or scheduled area (e.g. water recharge area).

Trend

There is likely to be increased use of the Planning Act to incorporate sediment control measures by including Housing Minister's conditions to that effect in subdivision and redevelopment plans.

UNITED STATES

Federal

There is no authorization for U.S. federal regulation of pollution from construction sites on non-federal lands. Planning and technical assistance programs are underway. Specifically, grants are provided through the Environmental Protection Agency (US EPA) to state and areawide agencies under Section 208 of Public Law 92-500. These studies address problems from construction site activity and define, where appropriate, regulatory measures to bring this source of pollution under control. US EPA is also involved in an extensive program of research and information dissemination through technical and popular publications, seminars and formal 208 program guidance on definition of construction site runoff problems and potential solutions.

Other federal agencies involved in information/technical assistance include the U.S. Soil Conservation Service (SCS) which conducts soil surveys and assists in development of erosion control techniques. Also the U.S. Geological Survey (USGS) through its water resource investigations assists in providing a technical basis for state and local programs.

It is U.S. Federal policy to require construction site erosion control on federal projects and on federally funded projects such as those involving housing development, federal office facilities or wastewater treatment facilities.

State

Within the Great Lakes Basin, control of erosion and sedimentation from construction site practices through prior approvals is required only in two states (Pennsylvania and Michigan).

The Michigan Soil Erosion and Sedimentation Control Act of 1972 requires that local government implement and enforce its own state-

approved permit program. Through the Michigan program both public and private earth change activity at construction sites must be carried out in accordance with an approved soil erosion and sedimentation control plan. (In Michigan the term "earth change" means any man-made change in the natural cover or topography of land such as grading, cuts, fills, or excavations which may result in or contribute to soil erosion). State and local public agencies which engage in frequent earth change activity may seek designation by the Department of Natural Resources (DNR) as Authorized Public Agencies for self-regulation. Under this arrangement, permit requirements are waived provided the agency operates a DNR-approved soil erosion control program.

The Pennsylvania rules and regulations for soil erosion control adopted under the Clean Streams Law require soil erosion control plans for all earth change activity involving construction sites. Prior review on a case by case basis is not required of such plans except for sites of greater than 25 acres where prior review and permit issuance are required. Implementation of the program is carried out locally by approximately 20 of the 66 soil conservation districts. The extent of program enforcement for the remainder of the state done by the Department of Environmental Resources is limited due to availability of staff. The result is that much construction activity in the state is carried out without prior review of control plans.

In Ohio, state law requires the Division of Soil and Water Districts of the Department of Natural Resources to adopt rules and regulations and administrative procedures for the control of urban sediment but stops short of state enforcement. The law does authorize counties to adopt rules and regulations for urban sediment abatement and enforce the same through approval of development plans. None of the other states in the basin have programs specifically designed to control pollution from general construction activity through prior approvals. Such legislation is under consideration in Indiana.

Sub-State

In all states in the Basin local units of government may pass ordinances to regulate erosion and sedimentation from construction sites without special state authorization. (In Ohio, as noted above 1978 legislation granted such authority to counties). These ordinances have been generally found by the courts to be a legitimate exercise of the local police power provided there is factual backup for the measures required and that they are fairly administered.

Trend

Continued general inaction at the local level is probable without state or federal action to induce implementation of controls. Effectiveness of the 208 programs in accomplishing this is still unclear, however, draft 208 plans do not reveal instances of specific local action (ordinance adoption). The few draft plans available for review tend to contain only general recommendations that local programs be developed.

OBSERVATIONS

Water pollution control legislation in Ontario, administered by the Ministry of Environment (MOE), is directed primarily to permit and approval control of point source discharges. Thus, in the absence of provincial sediment control law, it is not surprising that the province would turn to incorporation of sediment controls through mechanisms already established under The Planning Act.

However, the separation of agency authority for planning and for pollution control will be perpetuated by this trend. It is submitted that grafting new environmental concerns onto a statute that is silent on water quality and administered by an agency with a non-environmental mandate (i.e., Ministry of Housing and in some instances regional governments that have received delegated authority for subdivision and redevelopment control under The Planning Act) may not be sufficient to control erosion and sedimentation from construction sites. Difficulties with the current approach include: agencies with the greatest environmental expertise have the least legislative authority under the municipal planning process; the growth-development pressures on, or predilections of, local governments may serve to inhibit effective and systematic implementation of sediment controls; municipal by-laws and engineering practices which are or may be contrary to silt and stormwater controls; and the province's or regional municipalities' own pro-development policies.

Recent provincial legislation, that would authorize municipal topsoil preservation by-laws, is primarily directed to controlling commercial stripping of topsoil from good agricultural land. This practice has been a means of facilitating the re-zoning of agricultural lands for development purposes or simply a quick source of revenue.

The statute is not directed to controlling water pollution from soil erosion though this may be an ancillary benefit in certain limited pre-development instances. Generally, municipal topsoil preservation by-laws, where in effect, would not apply where they would be inconsistent with, or would prevent, construction otherwise authorized under the province's principal new urban development statutes.

An additional issue at the Canadian federal level is whether or to what extent the CMHC could constitutionally make adoption of provincial and local sediment control plans/laws, a condition precedent to providing funding for land assemblies and new communities.

1) CMHC could probably do so by simple agreement with the province.

2) CMHC could seek amendments to the NHA. However, it is arguable whether CMHC could amend the NHA itself such that it would not release funds unless it was satisfied by the way (i.e., the statutory approach) by which the province intended to control sediment for new community construction. That is to say, could CMHC say "no" to Ontario if the province insisted on using The Planning Act rather than enacting a sediment control statute. At

the least, it appears that it would be constitutionally open to CMHC to amend the NHA to make sediment control a condition precedent to the release of CMHC funds for new development. However, there may be some uncertainty as to the details surrounding this approach.

Throughout the Basin, reactive pollution controls may be exercised where a specific site is found to constitute a stream pollution problem. This abatement would require an ad hoc effort under authority of the state/ provincial water quality control law. A violation of water quality standards (state) or prohibitions (Ontario) resulting from the construction activity would have to be shown. This is a cumbersome procedure not well suited to monitoring the large number of potential sites where such violations might occur.

In states without state erosion and sediment control regulation, few localities have in fact voluntarily elected to adopt their own soil erosion control programs. Whatever the reasons for the lack of independent local action in this area, it appears reasonable to conclude that without additional positive or negative incentive a great increase in local controls is not to be reasonably expected.

Michigan's experience in implementing its program suggests that construction site erosion control can be integrated into local institutional mechanisms without imposing onerous costs on the regulated or on the regulator. This Michigan experience is consistent with conclusions of a study of erosion and sedimentation control programs in six states (not including Michigan) conducted by the National Association of Conservation Districts. The study found that where delegation of enforcement powers has been sought by a local entity and granted, the local units have been able to provide adequate manpower for program administration.

The Pennsylvania approach of providing for optional local management appears to have limited the extent to which construction activity has been subjected to prior environmental review due to staff and funding limitations at the state level. In Pennsylvania, the state rules do not actually require local governments to locally administer the programs. At the same time the state staff has not expanded enough to provide prior review of such widespread activity.

The Michigan Soil Erosion and Sedimentation Control Act appears to be an adequate incentive to obtain local action. However, many who have studied the program note the limited number of state staff to monitor local program effectiveness.

There are some interesting similarities and contrasts between Ontario and Michigan initiatives. The Michigan legislative approach involves delegating authority to local governments for sediment control. Ontario delegates much authority to local governments respecting land use planning and related matters. In both cases the state and the province retain supervisory authority. However, while the Michigan law

can be said to authorize or enable local government control principally for the purpose of environmental protection, this objective is clearly ancillary to the overall development planning context of The Planning Act of Ontario.

One strategy for control of construction site activity that has not been utilized in the basin but which may have merit for further consideration is a system of sediment charges where earth changers pay a specified assessment into a state, provincial or local fund (based on potential sediment contribution from the proposed development). Upon completion of the construction and demonstration by the developer that sediment and erosion have been controlled, all or a part of the charge could be repaid depending on the effectiveness of the controls employed.

STORMWATER RUNOFF

OVERVIEW

Permits or approvals for discharges respecting water quality from separate storm sewers are not required in either the U.S. or Canadian portions of the Great Lakes Basin. Indeed, stormwater runoff has been viewed at all levels of government more as a runoff disposal problem than as a water quality problem. That is to say, approvals have been traditionally related to hydraulic concerns and protection of receiving waters from the erosive effects of stormwater discharges.

CANADA

Federal

Recent amendments to the National Housing Act would appear to permit the CMHC to fund "innovative" stormwater collection techniques, such as on-site retention measures. Selected research and demonstration projects have been funded to date.

Funding for quality or treatment control of stormwater is not authorized under the Act. Research is being undertaken to determine what the costs to CMHC could be on a national scale, if stormwater treatment is required.

Under the 1971 Canada-Ontario Agreement on Great Lakes Water Quality an urban drainage subcommittee from Environment Canada and the Ontario Ministry of the Environment was established as part of the research program for the abatement of municipal pollution. The terms of reference include defining the magnitude of the pollution due to stormwater in the Basin; establishing priorities and schedules for studies directed toward potential solutions to stormwater pollution problems; and developing a strategy for implementing solutions.

A manual on urban drainage practice is being compiled which, it is anticipated, will suggest ways (technical and institutional) to implement runoff controls. The adoption of a Provincial policy on urban drainage is also expected.

Ontario

Many of the same comments noted under construction site runoff are applicable here. The Ministry of the Environment and some Conservation Authorities have adopted stormwater drainage recommendations to be made to municipalities concerning the conservation aspects of their official plans. These recommendations include committing the municipality to use its subdivision and redevelopment control powers to prevent unnecessary changes in the character of the predevelopment landscape, including topography, vegetative cover, and drainage. Environmental agency success in getting municipalities and regional governments to adopt appropriate stormwater and related controls has been mixed. As noted above the adoption of a general provincial policy on urban drainage is expected.

While some municipalities have adopted or investigated the feasibility of systematically implementing stormwater runoff controls, it is by no means evident that all or even most are considering or implementing them. Municipalities have traditionally been interested in facilitating rapid drainage; i.e., in getting rid of a quantity problem. Even in municipalities where stormwater runoff control is supported, serious financial and other constraints may exist to minimize the effectiveness of such policies and procedures. In one city, for example, while stormwater control was approved, the major conclusion of the report upon which the approval was based indicated that due to the high space requirements for major detention facilities detention should only be considered for minor stormwater runoff events in combination with flood plain management unless a detailed engineering study of a watershed can economically justify a higher degree of protection. In effect, the amount of land necessary to institute major upstream detention devices and the cost involved could make that approach difficult, if not impossible, in many instances.

Trend

Generally, greater Ministry of the Environment involvement is anticipated in stormwater runoff controls because of the Ministry's authority for approval and/or building of sewers under The Ontario Water Resources Act.

In recent years, only a very small percentage of sewage works that included storm sewers have contained requirements for some form of stormwater retention/detention. This is expected to increase with the adoption of a provincial policy on control of urban drainage arising from work done under the Canada-Ontario Great Lakes Water Quality Agreement.

UNITED STATES

Federal

The U.S. federal government does not directly regulate stormwater pollution problems on non-federal land. Several agencies are involved

intensively in programs which provide technical, educational and planning assistance to state and local governments:

(1) EPA under Section 208 PL 92-500 provides grants to states and areawide agencies to develop a water quality management planning process which addresses stormwater pollution problems among other things. The 1977 Clean Water Act extends the authorization for federal support of that program at 75% funding for fiscal years 1977-80. Additionally, EPA provides funds for selected demonstration projects, correction of combined sewer overflows through the municipal construction grant program, and an internal research and information transfer program to guide communities in problem definition, measurement, selection of best management practices and implementation arrangements.

(2) The Corps of Engineers provides technical and management services regarding flood plain data and flood hazards.

(3) U.S. Geological Survey conducts geologic mapping and water resource investigations to assist in definition of runoff characteristics, flood hazards, definition of sites for public facilities, and determination of land uses consistent with sound stormwater management practices. These projects are cost-shared with sponsoring state and local agencies.

Several federal programs also make financial assistance available to local communities for special or general purpose programs (i.e., HUD Community Development Block Grant Program), not related to stormwater runoff. Under present policies, no conditions are placed upon receipt of these funds with respect to local efforts to develop stormwater management programs. There is no policy respecting implementation of on-site runoff control measures on federal lands or at federal facilities.

State

The states have not been significantly involved in stormwater pollution control or planning. Exceptions to this are state activities in special purpose programs where stormwater management is implemented or encouraged as a part of a specific program for shorelands, wetlands or inland lake management.

State officials generally have not defined the extent of the stormwater management problem or prioritized it in the context of other issues of state concern. A state strategy for stormwater management has not been defined in any of the basin states. Impending deadlines for completion of state water quality management plans in November 1978 or at the end of the three year planning period should facilitate completion of initial expressions of state approaches to stormwater pollution problems. However, the considerable remaining uncertainty about the technical extent of the problems and the potentially high costs to localities of structural solutions may result in state reluctance to develop definitive programs.

Sub-state

Some U.S. cities in the Basin have undertaken programs aimed at correction of problems in existing built up areas (i.e., cities of Chicago, Saginaw, Milwaukee, and Detroit). These programs have been structurally oriented and have generally had as their primary objective the correction of combined sewer overflow problems, though ancillary benefits for stormwater pollution reduction may also be realized. The high cost of these types of projects makes their implementation subject to financial assistance from EPA under the municipal construction grant program or as special demonstration projects.

Some communities are experimenting with legal mechanisms which require on-site stormwater management measures for new urban developments. As a strategy these kinds of non-structural management programs appear to have merit since they shift much of the cost for stormwater management from the public sector to the parties generating those costs. These programs also generally focus on reducing increases in pollution from runoff where new development occurs. This management strategy could build on institutions utilized in current approaches to control of construction site erosion. For example, in Michigan review of erosion control plans by enforcement plans by enforcement officials often requires consideration of data on runoff and storm events necessary to determine sizing of temporary sediment basins or diversions. This same information could also be applied to calculation of needed permanent stormwater management measures. Consideration of such measures and selection of those appropriate to a specific development could be required by local programs parallel to those already in operation in Michigan for control of construction site erosion.

Trend

With respect to existing built-up areas the small number of localities that are taking action reflects, in part at least, the newness of the concepts and the lack of generally available experience with these programs. Continued general inaction respecting stormwater management for water quality objectives in both existing and developing areas is probable unless state or federal programs mandate local government action.

OBSERVATIONS

Two major educational obstacles will have to be overcome in both countries if non-structural preventive programs are to become widespread:

(1) Local officials and the public must become more aware of both the quantity and quality aspects of stormwater runoff problems. They must also become more familiar with and confident in the management mechanisms that can be employed to implement solutions.

(2) A cadre of technical and administrative personnel must be trained in techniques and procedures for management of programs aimed at on-site stormwater control. (This includes skills associated with calculations of runoff and sizing of facilities to detain runoff from specified storm events).

It appears that retroactive installation of on-site stormwater management structures in already developed areas through local ordinances (by-laws) that would parallel building and safety codes is an idea whose time has not yet come. Local approaches to stormwater management in already built up areas therefore would logically address selected structural or management improvements to the collection system. In undeveloped areas, adoption of preventive on-site management requirements appears to be an appropriate strategy. In either case, the local situation is so highly variable that prescriptions of specific measures or practices from the state/provincial or federal level are not likely to be effective. Solutions must be developed on a community by community basis.

In Ontario, the prospective policy on control of urban drainage will, with some exceptions, likely be implemented through the development planning process described under construction site runoff. For this policy to be fully effective, it will also have to address, if not resolve, the current separation of authority between agencies with planning and water pollution control functions. The current fragmented approach, it is submitted, will otherwise result in unsystematic control. In contrast, in the United States the current approach to planning for stormwater runoff control (through the 208 Program) while being brought about by an interest in pollution control is weak with respect to implementation. Since the agencies conducting the planning (e.g., regional councils of government and regional planning commissions) do not have the authority to implement their proposed programs, they are dependent upon the support of and action by local units of government. Sanctions that would compel enforcement of a 208 Plan are generally lacking, thus implementation will be variable depending on the interest, participation and commitment of the local units to the stormwater elements of the 208 Plan. Effective action by citizen interest groups may be integral to motivating local implementation.

Although pollution from stormwater runoff is a legitimate problem in itself, water quality issues need not be the sole basis for adoption of stormwater management programs. Such programs could also address:

- Erosion and sedimentation control.
- Flood control and prevention.
- Water conservation.
- Reduction of combined sewer overflows.
- Identification of illegal septic tank connections.
- Reduction of cost of provision of local public services. (for drainage)

Local units of government in both portions of the Great Lakes Basin have, with some exceptions, the necessary authority to develop and

implement stormwater management programs responsive to water quality objectives. However, there has not been systematic development of this authority by localities to attain environmental objectives.

The actual development and implementation of stormwater management programs would appear to be most effectively done locally. Yet since voluntarism does not appear to be a reliable strategy by which to accomplish reduction in stormwater pollution, the appropriate role for State/Provincial and Federal governments would be to adjust the incentives and sanctions which determine local actions.

At the Federal level this could be brought about through establishment of conditions on already existing financial assistance programs for local government. Without such sanctions the federal governments are in effect subsidizing stormwater pollution by facilitating development not sensitive to control of this pollution source. At the Province/State level, ample authority exists to require that local governments address this issue. State approval of local programs could be required without state specification of the exact elements of a local program. Precedent for this already exists in several states with respect to requirements for local solid waste or water and sewer plans, and in Ontario with respect to Official Plan requirements. Areawide water quality management planning being conducted under Section 208 should define problems and provide resources upon which local governments may draw. However, the trends evident from draft plans suggest that more specific local programs are needed.

Also of importance at both the Federal and State/Province levels are the government proprietary activities involving facility construction, location and land management practices. These activities could serve as an example of what can be done with on-site stormwater management techniques if policy and regulations are appropriately adjusted.

AGRICULTURE

PESTICIDES

OVERVIEW

In both the U.S. and Canada regulation of pesticides is premised upon protection of ecological balances and the prevention of accumulation of pesticides which are highly toxic or persistent in the environment. At the federal level in both countries, regulation of the agricultural use of pesticides emphasizes controlling their market availability.

CANADA

Federal

The Pest Control Products Act, administered by the Canada Department of Agriculture (CDA), regulates registration, packaging and labelling of

such products. Product availability for certain uses may also be limited and use of pesticides that is inconsistent with labelling directions may be prohibited. Registration, re-classification and cancellation decisions may be made on environmental grounds. Selected pesticides have been banned.

Licence, permit or approval control of how the agricultural community actually uses such products, in terms of quantities or rates of application is not part of the CDA program.

Ontario

Farmers or farmers helping neighbours (where only one spray rig is in operation at a time) are exempt from licence or permit requirements for pesticides under the Pesticides Act. Pesticide use under these categories is estimated to be approximately 60% of all pesticides used in the province. An additional 15% of pesticides used in the province (and also applied to agricultural lands) are applied by businesses or applicators. These categories require licences. Licensing and remedial enforcement may be done on the basis of natural environment and public health implications.

UNITED STATES

Federal

In the U.S. two federal laws, administered by US EPA, regulate pesticides and set the pattern for required state programs. The Federal Environmental Pesticide Control Act (FEPCA) amends the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). Under FEPCA all pesticides used in the U.S. must be registered and classified by US EPA. General use pesticides are those which the agency has determined will not generally cause adverse effects on the environment when used in accordance with commonly recognized food practices. A pesticide will be classified for restricted use if US EPA determines that adverse effects on the environment, including injury to the applicator may result from normal use of the pesticide. US EPA may impose special limitations on these restricted use pesticides. The US EPA's testing and classification program is considerably behind schedule due to the large number of pesticides to be tested and the limited resources allocated to the program. It has been estimated that it will be many years before all pesticides in current use are tested and a determination made on their registration.

The Act also provides for restrictions on pesticide use and handling. FIFRA sets federal standards, requires certification of applicators, and provides authority for states to conduct pesticide control programs. States may require registration and minimum labelling. If the states so desire, they may administer the applicator certification and training program upon approval by EPA. In the U.S. both private (i.e., farmers) and commercial applicators must be certified, thus going considerably beyond the Ontario requirements for licenses which exclude farmers and farmers helping neighbours.

State

Prior to recent federal amendments the state pesticide control programs generally did not address licensing or training of private (i.e., farmer) applicators. Adjustments to those state programs to meet federal requirements have now largely been completed. In the U.S. portion of the Basin, therefore, a relatively uniform program of pesticide licensing control is in operation.

BASIN-WIDE TRENDS

With some exceptions, it would appear that future regulation of pesticides will continue to emphasize control of their market availability for certain uses. In Canada this control will not include regulation of principal pesticide users (i.e., farmers) in their capacity as user. In the U.S., state certification and training programs for private and commercial applicators conducted by the states will provide assurance that personnel, including farmers, handling pesticides are knowledgeable about application procedures and potential hazards of use. In both countries pesticide bans will be limited to those pesticides with the greatest capacity for persistence in the environment. In the U.S., agency decisions respecting pesticide availability have been and likely will continue to be subject to challenge in the courts. In both countries where research results in the development of less persistent pest control chemicals, or in alternatives to chemical pest control, these may replace older, more problematic pesticides.

OBSERVATIONS

A significant distinction between the U.S. and Canadian pesticides programs is that in the U.S. it is necessary for the individual farmer to be trained and certified. It is not felt to be sufficient to deal only with the manufacturer in conjunction with the banning of selected pesticides. However, the assumption in Ontario appears to be that only the manufacturer, businesses and "professional" applicators need licensing or certification, i.e., need to demonstrate competence. This appears to be true despite continued concern for the way farmers handle pesticides in Ontario, and the potential impact to lakes and watercourses.

It is interesting to note that despite the seriousness of potential public health and environmental problems posed by misuse of pesticides, neither nation has responded with regulatory arrangements parallel to the controls on prescription drugs.

An analogy could be drawn between requiring a licence or permit prior to application of certain pesticides and requiring a prescription prior to purchase of certain drugs. In Ontario, this analogy is currently followed for the "hardcore" pesticides (e.g., aldrin, dieldrin, DDT, heptachlor) under Schedule 1 of the Pesticides Act, but not for pesticides under Schedules 2 - 6. However, not all pesticides that may cause problems are covered by Schedule 1. For example, farmers may apply Schedule 5 pesticides to agricultural lands without licence or permit restraints. These pesticides, like those under Schedule 1, are defined

by the Ontario Pesticides Committee as "pesticides that pose a serious hazard to public health and/or the natural environment". Apart from persistence, pesticides in Schedule 5 do not appear to differ greatly from those in Schedule 1. Interestingly, the committee indicated that they have not been placed in Schedule 1 (and thereby subject to greater controls), because of "the lack of less hazardous control products which could provide adequate protection to agricultural crops".

Regardless of how knowledgeable the applicator and how effective the registration, classification and labelling programs, the very nature of pesticide use involves placing a chemical which is poisonous to selected organisms on large land areas where it becomes subject to pickup by overland runoff during storm events. Because of this, some have argued that a complete program to limit water pollution from pesticide use should include control of farmland erosion. This has not been addressed in pesticide regulations nor is it being considered for incorporation into such regulations. However, it should be recognized that an ancillary benefit in implementing state farmland erosion control programs may be reduction of the impact of pesticides on water quality.

FERTILIZERS

OVERVIEW

Laws in the Great Lakes Basin regarding fertilizers are directed at health and consumer protection objectives. There are no controls on fertilizer use or application rates as would be responsive to water quality control objectives. Existing controls address manufacturing, registration, labelling and distribution issues.

CANADA

Federal

The Fertilizers Act provides for registration, packaging, and labelling of such products. Unlike the Pest Control Products Act, the Fertilizers Act does not authorize the Canada Department of Agriculture to refuse to register or to continue to register a product if its use would lead to an unacceptable risk of harm to the environment alone. CDA administrators note that producers applying for product registration must ensure that their products now meet environmental criteria in addition to those criteria applicable to public health and plant life. However, it is doubtful that product registration could be denied or revoked on the sole basis of adverse impact to water quality.

Ontario

No approvals are required for fertilizer use and application. A voluntary soil test program is funded and administered by the Ministry

of Agriculture and Food (OMAF) and the University of Guelph. Through a network of county and extension service representatives, OMAF provides farmers with general fertilizer use recommendations for varying soil and crop types.

UNITED STATES

Michigan, Minnesota, Ohio and Indiana have laws which provide for control of manufacture, distribution and labelling of fertilizers. The state cooperative extension services through the land grant colleges of each state have been active in providing informational assistance to farm operators on the amount and type of fertilizers to be best used for specific crops. Productivity has been a keynote of such programs in the past.

BASIN-WIDE TRENDS

Current trends suggest no significant departures from the present situation. New regulatory measures appear unlikely. Continued emphasis on educational and advisory programs is anticipated with occasional prosecutions of farmers in the event of a dramatic instance of water quality impairment. It is also likely that more extensive use of farm demonstration plots to prove the efficacy of proper fertilizer application rates will be undertaken by the appropriate agencies.

OBSERVATIONS

Despite the use of voluntary soil test programs, Ontario farmers have been known to disregard soil test recommendations. For example, one 1972 study by the University of Guelph, found that 56% of farmers carvassed in one county made changes in soil test report recommendations that OMAF and the University researchers regarded as ill-advised. A study of the Thames River Basin also found that fertilization of cropland beyond recommended rates was a general practice in the Basin. A PLUARG survey of Canadian farmers found while approximately 90 percent of the farmers were aware of soil testing services, only 60 percent had ever had their soil tested for fertilizer needs. In addition, in the agricultural watersheds monitored by PLUARG farmers were found to use on average twice as much fertilizer phosphorus as was necessary.

The use of voluntary programs in lieu of a more preventive regulatory scheme places a premium on prosecution and abatement of dramatic instances of pollution, such as fish kills or high nutrient loadings, in a situation characterized by general pollution from many diffuse farm sources. Such reactive control tools (e.g., selected prosecutions) are cumbersome because of the large number of farms where violations might occur. It is difficult to evaluate whether this approach will have the desired educative/deterrent effect on the agricultural community. Moreover, use of selective prosecutions also leaves the enforcing agency open to charges of arbitrary use of regulatory enforcement tools.

Many officials in both the U.S. and Canada are of the opinion that fertilizer control beyond the present arrangements cannot be justified on water pollution control grounds unless convincing new evidence is put

forth. To whatever extent problems are perceived to exist, these officials note that rising market prices for fertilizers will tend to effectively reduce future instances of misuse since farmers will be more likely to assure only the required amounts of fertilizers are purchased and that all fertilizer is put to use by the crop. To the contrary as noted above there is some evidence that overuse of fertilizer occurs notwithstanding recent price increases.

One approach open to regulatory agencies is to control fertilizer use by controlling fertilizer sales (parallel to the prescription drug analogy cited under PESTICIDES). This would mean limiting the amount of fertilizer sold to a farmer to that recommended in an approved soil test, or crop needs analysis, multiplied by the number of acres he intends to have in production for that crop year. This would require a state or provincial law which would first make a soil test or crop needs analysis mandatory and second, require adherance to the test/analysis recommendations. This approach while administratively feasible might be costly, both in terms of greatly increased numbers of soil samples and surveillance (This is quite apart from likely opposition from the agricultural community to this approach). Moreover, it may not be justified by the extent of the problem associated with fertilizer use. However, educational programs may not be capable of achieving the same result as preventive regulatory controls.

One problem attendant to any voluntary program is that factors facing the farmer in deciding how much fertilizer to apply tend to create a "when in doubt, fertilize more" strategy. In this situation, the cost of reduced yield is potentially high and accrues entirely to the farmer, yet the marginal cost in dollars to the farmer of extra fertilizer to assure high yields is small and the environmental costs accrue mainly to society. In addition, representations by the fertilizer industry may contribute to farmer decisions to overfertilize.

If voluntarism ought to be supplemented, the question emerges as to how this could be most efficiently done without creating an unacceptable burden to the farmer. Two strategies which could be considered are:

(1) Assume that a sound farmland soil erosion control program would sufficiently limit fertilizer contributions (particularly phosphorus) to Great Lakes water quality problems. Procedures to develop such a program are discussed separately below.

(2) Directly limit the likelihood of fertilizer application in excessive amounts by linking the various farm assistance loan and grant programs (e.g. crop insurance) to farm operators' agreements to apply only recommended minimum quantities of fertilizers based on soil tests.

FEEDLOT OPERATIONS AND ANIMAL WASTES

OVERVIEW

In both countries feedlot operations and animal waste management practices are essentially unregulated because of either limited (U.S.) or non-existent (Canada) permit requirements as well as unsystematic enforcement. Water quality protection is primarily dependent on voluntary farmer compliance with good farm practices and codes.

CANADA

Federal

Under the Income Tax Act regulations farmers are permitted to write off over two years the total cost of equipment and processes installed for the primary purpose of controlling water pollution from animal wastes associated with feedlot operations or related farm structures.

There are no permits required at the federal level for water pollution control for feedlot or related farm operations or structures.

Ontario

No environmental approvals or permits are required for feedlots or generally for animal wastes disposal. Prospectively, large new, expanded or altered feedlots may require approval under the Environmental Assessment Act, 1975. To date, no feedlot proposals have been made subject to the Act.

While animal waste disposal done in accordance with normal farming practice is exempt from prosecution for impairing the quality of the natural environment under the Environmental Protection Act, it is not exempt from prosecution for pollution of surface and groundwaters under the Ontario Water Resources Act.

The non-statutory Agricultural Code of Practice was developed to assist interested farmers to reduce pollution of air, soil and water from their livestock operations, and to provide the livestock industry with guidelines for the use of land. The Code provides management recommendations to control water pollution caused by watering the livestock in streams, ponds or lakes, as well as manure management techniques for controlling runoff from feedlots and fields.

The Code is advisory in nature, though farmers are strongly urged to apply for a certificate of compliance issued by the Ministries of Environment, Agriculture and Housing.

The most recent version of the Code contains a set of formulae in the appendix. Formulae One and Two are meant to be incorporated into municipal zoning by-laws pursuant to Section 35 of the Planning Act, where municipalities so desire for control of air/odour problems.

Formula One generates appropriate minimum set-back distances for other land uses (e.g. new housing developments) establishing or expanding in close proximity to livestock operations. Formula Two generates appropriate minimum set-back distances for livestock operations establishing or expanding in close proximity to other land uses (e.g. residential housing). The Code formulae are in relation to air and odour problems, not water pollution.

The Environmental Quality Subcommittee of OMAF-University of Guelph brings together farmer, industry, government and the university to discuss and recommend sound soil management practices. The Subcommittee reviews recommendations for soil management practices, in Ontario to ensure that their potential for detrimental effects on the environment is within acceptable limits. It makes representations to the appropriate organizations when currently followed practices, whether recommended or not, have the potential for unacceptably detrimental effects on the environment; and it defines research requirements in relation to the effects of soil management practices on environmental quality.

A Farm Pollution Advisory Committee (made up of members of the agricultural community) assists the province (MOE) in attempting to resolve selected pollution problems when all reasonable provincial efforts to achieve abatement have failed. OMAF extension services are also available to assist with existing or prospective pollution problems.

Municipal by-laws under Section 35 of the Planning Act are used to require building permit control of feedlot/farm air/odour problems. But they are not capable of being used to deny such permits for water quality reasons in conjunction with the voluntary provincial Agricultural Code of Practice and formulae thereto.

UNITED STATES

Federal

Though feedlots may bring about both point and nonpoint source pollution, they have been defined as point sources by Section 502(14) PL 92-500. Under EPA regulations, only about five percent of the nation's feedlots are required to have NPDES permits. The administration of this permit program is carried out in each state in compliance with federal requirements. Those feedlots which have surface water discharges and which exceed 1,000 animal units must have permits and meet effluent limitations which require that there be no surface discharge from the feedlot of either waste or runoff which has been contaminated by waste unless it occurs as a result of a 25 year, 24 hour storm event. Additionally, feedlots with more than 300 but fewer than 1,000 animal units must have permits if the operation has either a man-made conveyance through which pollutants are discharged or if it discharges pollutants to waters passing through or coming into direct contact with animals in the confined area. Further the regulations provide that any feedlot of fewer than 1,000 animal units regardless of whether the feedlot has a discharge or has a stream passing through the site may be required to have a permit if after on-site inspection and written notice to the owner it is

determined to meet certain designated criteria (respecting for example: proximity to waters, slope, vegetation, rainfall, likelihood of discharge).

Apart from the permit program under the NPDES the federal government is involved in programs that provide financial assistance through cost-sharing and pollution abatement loans or fiscal incentives such as investment tax credits or accelerated depreciation to farmers to facilitate compliance with water quality requirements.

An active program of information and technical assistance is available through the Soil Conservation Service and through the cooperative extension programs in each of the states to make farm owners and operators aware of the need to contain animal waste pollution and to inform them about effective approaches for doing so. Both EPA and USDA have a role in research and demonstration efforts aimed at control of pollution from feedlot operations.

State

Control of feedlot operations through prior approvals varies considerably from state to state. Each state has the authority to go beyond the permit requirements of the federal NPDES. Indiana has a program which covers all but the smallest barnyard operations. Competing budget priorities have resulted in allocation of only a small state staff to the program, thus a backlog of cases has developed and no routine inspection and monitoring is carried out. Pennsylvania has authority to control feedlot operations through its Clean Streams Law and has developed guidelines for when a feedlot permit is required. However, because the pollution problem is viewed as minimal in the state, a separate permit program has not been developed. The state (DER) conducts a review of each feedlot and where necessary issues an NPDES permit. In Wisconsin, proposed rules to expand coverage of feedlots were not approved; thus, only the large feedlots are covered. Programs in New York, Ohio and Michigan are similar although New York, like Indiana, has adopted state guidelines on feedlot operation or animal waste disposal. These guidelines are implemented through the state cooperative extension services. Ohio law stipulates that rules and regulations and administrative procedures be adopted by the Division of Soil and Water Districts of ODNR and grants the enforcement authority to the state. The program's enforcement provisions however do not come into force until 75% cost sharing from public funds (not to exceed a payment of $5,000 to any person) is available. An Ohio animal waste guide to alternative facility design and management has already been developed by five cooperating agencies.

Sub-state

Land use authority at the local level is not a viable mechanism for control of pollution from feedlot operations since local zoning regulations primarily address issues of property protection and adverse land use interdependencies.

BASIN-WIDE TRENDS

In Ontario the trend will be toward increased monitoring, educational approaches, fiscal assistance and selected prosecutions. Use of preventive regulatory tools (i.e., permits, approvals, etc.) appears unlikely.

In the U.S., without regard to differences in magnitude of the feedlot pollution problem, it is evident from a purely institutional standpoint that nonpoint source pollution from animal wastes is not controlled in the Basin. The trend is toward continued monitoring of a few feedlots through the permit process, required by NPDES. Other government planning, education, or assistance programs will continue to be emphasized perhaps with an increased level of support.

OBSERVATIONS

It is difficult to evaluate the above noted Ontario trends as comprehensive substitutes for preventive regulatory controls in protecting water quality. For example, despite voluntary Agricultural Code of Practice recommendations against farmers spreading manure on frozen fields in winter, the PLUARG Agricultural Practices Survey indicated that between 32 and 42 percent of Ontario livestock farmers spread manure during winter months.

The exemption of farm operations from permit requirements deprives the province of its best means of remaining aware of potential problems, and of taking action before they give rise to serious pollution incidents. The essential characteristic of a permit program is that it establishes a direct connection between the regulated and the regulator. Where a farmer is under an obligation to identify himself, the nature of his operation and types, quantities and rates of wastes generated, a pollution control agency is generally in a better position to prevent problems from arising than where the farmer is anonymous. In the latter situation, the burden is not only on the agency to find the farmer, but to find him blatantly polluting.

Farmers are not exempt from broad water quality impairment prohibitions under the Ontario Water Resources Act, as they are from the provisions of the Environmental Protection Act. But these -- where they are enforced -- tend to be less effective against the more subtle, diffuse sources of pollution than against well-defined point sources. Moreover, they leave untouched the problem of the extra costs incurred by farmers in controlling water pollution from, for example, barnyards and unroofed manure storage areas. In sum, the variety of factors which combine to constrain the effectiveness of current enforcement options and the frequency of their use include:

(1) Runoff from agricultural lands is frequently so diffuse in nature, that identifying the main farm source from among many similar sources becomes difficult, if not impossible. Thus, the utility of prosecutions diminishes.

(2) Given scant field resources and no requirement that all farm operators identify themselves and the nature of their operation to the province, abatement efforts tend to concentrate on the more dramatic pollution instances such as fish kills.

(3) The province tends to support a cooperative voluntary approach with the agricultural community.

A more basic question, particularly in Ontario, is the strategy to be utilized in achieving pollution control objectives. Some have argued that direct subsidization of the farmer is preferable to a preventive regulatory program. Yet even with a subsidy program, society requires some assurance that its money is being used effectively. It is not reasonable to expect that the farmer could provide this accountability without some form of regulatory control. The traditional role of regulatory agencies is to establish accountability by those using public resources (both natural and financial).

Moreover, it is not clear that the simple existence of financial programs whose primary purpose is pollution control would necessarily result in their utilization on a systematic basis by the agricultural community. In this situation societal benefits in the form of improved water quality may frequently outweigh personal benefits to be gained by the farmer. Thus, widespread use of such assistance may well be unlikely without compulsory participation. The notion of compulsory participation in financial assistance programs, apart from being virtually unheard of, is in effect a quasi-regulatory program in itself.

An additional issue of considerable import is the way a permit program is used as a preventive control strategy. For example, in the U.S., the NPDES permits required for feedlots address point source discharge to surface waters only. Federal regulations require only a small percentage of the total number of feedlots to have permits.

Testimony at 1973 hearings before a House Subcommittee of the Committee on Government operations cited U.S. EPA studies which indicated that 70% of the feedlot operations above the initially proposed cutoffs were already in compliance with recommended effluent limitations while for those feedlots below the cutoff, compliance dropped to 20%. Final regulations published in 1976 by U.S. EPA, in effect, established a lower cutoff number. However, even under the new regulations only about 3,300 feedlots nationwide were anticipated by U.S. EPA to be subject to the regulations. The addition of a category where feedlots designated on a case by case basis after on-site inspection may be required to have permits was intended to provide agencies with the flexibility to control the "problem feedlots" below the cutoff. However, the reliance of regulatory agencies upon such case by case identifications is unsystematic and in effect exempts from regulation that major portion of the industry which is least in compliance with the limitations while controlling the relatively few operations which are already most in compliance.

Implicit in the concept of a cut off is the notion that numbers are determinative of seriousness. Yet there are factors (e.g., slope, proximity to streams, poor management practices) which can result in feedlot pollution regardless of the number of animal units. Under these circumstances, it would appear that the U.S. regulatory mechanisms for controlling those operations which fall below the permit cutoff are essentially the same as those in Ontario (i.e. selected abatement of dramatic instances of pollution, advisory assistance and voluntary farm codes).

Broadening the coverage of existing permit programs may not be the only solution. The proposed regulations for feedlot and animal waste management under consideration in Ohio utilize an approach that goes beyond voluntarism yet stops short of establishing a permit system for control of pollution from approximately 18,000 feedlots in the state. Ohio's concept is that good construction can be accomplished without the paperwork of a permit. More importantly, state officials note that the effectiveness of a facility is a function of management capability and performance of the operator and that these factors are not necessarily assured by discharge permits.

Consideration of this approach may be appropriate in jurisdictions where nonpoint source feedlot controls currently do not exist. The proposed Ohio program involves adoption by the state of mandatory performance standards. These standards specify generally applicable management practices for feedlot operations and disposal of animal wastes. Farmers would be considered in compliance with the standards if they are following a feedlot/animal waste management plan approved by the local soil and water conservation district. Where problems arise, the involved agencies have available a sequence of enforcement options. The Ohio proposals have the advantage that (a) control of nonpoint sources of pollution from feedlots/animal wastes and from general farmland erosion can be achieved under the same statutory and administrative package and (b) feedlots which do not meet threshold numbers specified in Federal Regulations under NPDES are subject to state standards. An additional advantage to the Ohio proposals is that many drawbacks attendant to the permit approach can be circumvented (e.g. the administrative burden of managing 18,000 permits and the resistance of the agricultural community to mandatory permits). The program however, has the disadvantage that it lacks the action forcing provisions that a permit or certificate of compliance mechanism could provide. Under the proposed rules there would be no direct link between the farmer and the enforcing agency. The link would be indirect in that the agency specifies the standards applicable on a statewide basis without regard to individual conditions. There would be no requirement that the individual farmer identify the nature of his operation to the state.

SOIL EROSION

OVERVIEW

Farm management activities that influence soil erosion from cropland are characterized by many individual farmers making independent decisions. Yet, a vast number of programs and institutions at all levels of government

substantially influence the way farmers select and implement farm management practices. However, there are no preventive pollution control mechanisms in the Basin that compel farmers to control soil erosion from plowing and tilling practices.

CANADA

Federal

Before 1970, Canada-Ontario Agricultural and Rural Development Agreements (ARDA) contained sections on the development of projects for soil and water conservation. These were dropped in 1970, and are not included in the present agreements, though the statutory base for them continues to exist.

Some financial assistance for soil erosion control is possible under other Federal statutes, such as the Farm Credit Act (for permanent improvements) and related statutes. To date the farm community has not made use of these provisions. Administrators of these statutes do not promote the soil conservation assistance possibilities of these statutes. They also do not anticipate a significant demand for use of these statutes for soil conservation purposes in future.

Ontario

No approvals or permits are required for control of soil erosion and sedimentation from general farm crop production practices. Little evidence was found of provincial advisory programs directed at reducing agricultural soil erosion. During the 1950's and early 1960's a program of preparing individual conservation plans was operated by OMAF. This program has since been discontinued and present provincial programs have tended to emphasize productivity. The role of The OMAF-University of Guelph environmental quality subcommittee has been mentioned above.

Under the Woodlands Improvement Act, the Minister of Natural Resources may enter into agreements with land owners, including farmers, for the planting of trees or the improvement of woodlands that have been designated as private forest management areas.

Some Conservation Authorities, which are organized on a watershed basis, assist farm owners with serious bank erosion problems caused by livestock access to streams. Such techniques as vegetative buffers along banks and fencing have been used on a limited basis. Lack of broader funding appears to limit the wider development of such programs. (The ACCA program described under feedlots does not fund control of livestock stream access or revegetative techniques, but emphasizes assistance for traditional abatement technologies).

In watersheds undergoing rapid urbanization, Conservation Authorities have generally modified their erosion control services accordingly. Thus, there has been a marked shift away from assistance to farmers for agricultural practices that reduce erosion (e.g. strip cropping and

grassed waterways) to programs of more general application such as bank erosion control and tree planting.

Where elements of agricultural erosion control assistance have been retained or re-introduced in some Conservation Authority programs, lack of broader funding and the existence of other Authority priorities such as flood control and recreational landfilling projects, appear to limit the greater development of soil conservation programs.

Trend

Increased education and demonstration projects are likely through provincial and Conservation Authority programs. These may be constrained by level of farmer interest and limited funding unless federal-Ontario agreements re-invigorate currently dormant ARDA provisions respecting soil and water conservation.

UNITED STATES

The single most significant program is that conducted by SCS where technical assistance is made available to farmers through local SCDs. By signing a cooperative agreement with a district, a farmer may have a conservation plan prepared for his farm. The plans have traditionally addressed soil conservation and erosion control measures to protect and enhance the natural productivity of the land, to an extent many of these measures have provided water quality benefits. In the last few years there has been increasing interest by SCS in water quality implications of the farm conservation measures with results that now many plans include measures aimed more exclusively at water quality protection.

An especially important aspect of the SCS overall program has been its success in developing a strong local-state-federal partnership. The SCS has a well established rapport with state and local governments and a good working relationship with individual farmers. Much of this rapport is the result of an SCS commitment to work through local governmental entities which can serve as intermediaries between the federal programs and the local farmer. These entities, called Soil Conservation Districts or Soil and Water Conservation Districts are special purpose units of government authorized in each state and established in the Great Lakes Basin by local action normally on the basis of county boundaries. The districts are governed by locally elected boards of supervisors. Districts conduct programs of technical assistance for land users which focus on voluntary establishment of conservation measures. These programs are made possible through arrangements with SCS where technical support personnel are attached to work in each district. An additional factor that accounts for the rapport between the federal program personnel and local farmers is the emphasis on voluntarism. A keystone in the program is the principle that a farmer voluntarily comes to the SCD to have a conservation plan prepared and that once completed the farmer voluntarily implements the plan.

Numerous other state and federal programs provide fiscal assistance and information/education support to the farm community in furtherance of soil conservation objectives. Notable among these are programs of the U.S. Agricultural Stabilization and Conservation Services (ASCS) which,

like the SCS, operates through a network of state and local policy and administrative units. The ASCS administers several fiscal assistance programs. Particularly significant is the Agricultural Conservation Program (ACP). This program makes federal funds available on a cost-share basis for implementation of selected soil and water conservation measures. County ASC committees, made up of local farmers, share in determining which measures will receive cost share funds in each county and what percentage of cost-share can be paid.

Although water quality improvements can result from measures cost-shared through the ACP and through other assistance rendered by agriculturally related agencies, these programs are designed primarily to accomplish conservation goals. Section 35 of the 1977 federal Clean Water Act provides for a program of technical and financial assistance for implementing long term measures which are aimed at improving water quality. The only measures which may be funded under this program are those which have been approved as best management practices under EPA-approved state and areawide 208 plans in areas where those plans are being implemented. Priority will be given to those areas and sources that have the most significant effect on water quality. To carry out the program, the Secretary of Agriculture shall enter into agreements as appropriate with soil conservation districts, state soil and water conservation agencies and state water quality agencies to administer all or part of the program. Provision for payments to reimburse administrative costs is made in the Act. The conference committee in approving this section of the 1977 Clean Water Act noted that the expressed purpose of this cost-sharing program was the reduction of nonpoint sources of pollution and that purely production-oriented practices were not to be financed through this program.

Trend

Considerable attention has been devoted to approaches to providing additional technical direction and educational programs for farmland management practices. In some areas such as Ohio this interest has been in anticipation of possible federal regulations. In many areas the 208 studies appear to have brought the issue to the attention of officials and the general public. A result of the 208 studies has been a better definition of how farmland erosion problems may be addressed.

The strong commitment to voluntarism by the SCS/SCD and, indeed, the effectiveness of voluntarism with some portions of the farm community, has led to a general attitude that a program requiring permits for general farm operations is neither desirable nor necessary. The administrative burden that such a program could impose has also served to discourage many officials from supporting the permit approach. On the other hand most involved officials are quick to concede that with only voluntary programs many serious problems will continue to go unaddressed. Several state legislatures are considering passage of measures that would either provide additional enforcement authority to the SCD's or set standards which would increase the likelihood of implementation of sound farm management practices as recommended by the SCD. A long term formal agreement for implementing farmland best management practices appears to be an important element.

Information and education programs will continue to be actively promoted. Cost share funds made available through the 1977 Clean Water Act specifically for implementing management practices directed at water quality improvement will speed the voluntary process, provided the 208 programs are approved in a timely fashion and are specific enough to identify the measures eligible for cost sharing.

OBSERVATIONS

Canada has no institutional relationship comparable to the SCS/SCD programs which exist in the United States. Conservation Authorities have objectives comparable to those of SCD's (i.e., generally conservation and restoration of natural resources) but their influence on the soil conservation practices of farmers appears, with some exceptions, to have been marginal. To the extent that soil conservation is more entrenched in theory and in practice in the Basin states, one could argue that the absence of a comparable SCS/SCD arrangement in Ontario has been detrimental to the systematic development of agricultural soil conservation in the province. Without SCS, the success of SCD's in promoting soil conservation might be indistinguishable from the situation of Ontario's Conservation Authorities. (This is quite apart from the other priorities of Conservation Authorities such as flood control management, or more recently recreational landfilling, which may compete for funds that might otherwise go to soil conservation initiatives.)

Conservation Authorities are, however, organized by watershed rather than by political boundary (as is the case with many SCD's in the Basin). It could be argued that, other things being equal, soil conservation is better facilitated when approached on a watershed basis than on the basis of political boundaries. Under present arrangements in the U.S. portion of the Basin, management on a watershed basis would have to be accomplished by interdistrict associations or other coordinative arrangements. Authority for such coordination exists and some examples of district cooperation to attain watershed goals may be found.

Some provincial programs have not been used to subsidize control of nonpoint pollution, though they could be authorized to do so. For example, under the Woodlands Improvement Act, the Ministry of Natural Resources could enter into agreements with farmers for the planting of windbreaks which, by reducing wind erosion, could assist in water quality protection. However, as a matter of policy, MNR does not enter into agreements for the planting of trees on private lands unless the landowner wishes to plant at least ten acres. The policy was instituted because it was not believed to be economically viable for the Ministry to plant trees on less than ten acres at a time. The policy effectively eliminates the Act as a tool for the planting of windbreaks on farmlands, since to be effective, windbreaks must be planted as a single stand of trees 1,000 feet to a half mile long. The policy has been understood to adversely affect some agricultural counties subject to wind erosion.

Implementation of additional controls on farm practices by relying solely on initiatives at the local level does not appear to be viable as an

approach to reducing pollution from agricultural activities in the basin. The only states in the Basin where SCD's are empowered to adopt land use regulations are Illinois and Wisconsin. In neither state, however, have regulations been adopted by a district within the basin. Outside the Basin the Vernon County Soil and Water Conservation District, Wisconsin has adopted regulations which were approved by referendum in November 1976 and adopted by the County Board of Supervisors June 1977. This is due in part to the requirement that any regulations be approved by a referendum vote. A US EPA-funded demonstration project under Section 108 of PL 92-500 is currently being conducted by the Washington County Soil Conservation District with the objective of developing guidelines and regulations which would have sufficient support to be adopted. (The project is due for completion in the latter part of 1978).

Though local initiatives to implement mandatory controls throughout the basin may not be likely, it is clear that any effective approach to control of farmland erosion will involve greater participation by farmers in the erosion control programs offered locally through the SCD's. Since development in 1973 of the Model State Act for Soil Erosion and Sedimentation Control (prepared by the National Association of Conservation Districts in cooperation with the Council of State Governments), several states have passed legislation which strengthens this SCD role.

Pennsylvania has authority through its Clean Streams Law to control activities on farms which may lead to pollution of the waters of the state. DER regulations require farmers to have erosion control plans through their local SCD's (New York has a similar arrangement), but permits are not required. The districts can apply to the state for authority to administer and enforce the regulations. About 21 of the state's 66 districts have requested and have been granted this authority. Availability of DER staff to monitor and enforce the regulations in areas where local units have not elected to administer the program appears to be limited. At present about half the farms in Pennsylvania are operating under erosion control plans.

In Michigan the Soil Erosion and Sedimentation Control Act will cover agricultural activities except plowing and tilling after January 1979. Under the Act, farmers will be required to have a permit from a county enforcing agency for earth change activities (e.g., farm ponds, tile drain installation). Permit issuance is based upon submission of an adequate erosion control plan for the earth change activity. Farmers who have agreements with their local SCD become exempt from permit requirements, though they still must comply with the Act. Thus an incentive is created to bring farmers to the districts for development and implementation of farm erosion control plans. This program would appear to be an effective approach to bringing farm practices under control with its major weakness being the exemption of plowing and tilling from provisions of the Act.

In Ohio, legislation has been enacted by the General Assembly which authorizes the Division of Soil and Water Districts of the Ohio DNR to adopt rules and administrative procedures regulating agricultural pollution. Enforcement respecting agricultural sediment was deleted from the originally proposed bill. The program utilizes state performance standards based upon

maximum allowable soil loss (as derived from the universal soil loss equation). Farmers following an approved farm conservation plan are presumed to be in compliance with the standards. However, such a plan is not required by the proposed rules (thus preserving the voluntary aura of SCD functions and allowing the districts to concentrate their attention on problem situations).

In both the U.S. and Canada there are a large number of fiscal assistance programs available to the farmer through various federal programs for all aspects of farm operations. It should be noted that an option for encouraging wider use of farm management practices based upon protection of water quality would be to make individual participation in any fiscal assistance program (e.g., crop insurance, farm loans, price supports) contingent upon a farmer's demonstration that his farm is being managed in accordance with practices appropriate to agricultural pollution abatement as determined for his area. Such a program could be implemented through federal action without initiatives at the state/provincial or local level.

Attention has been directed to Water Quality Management Planning Programs being conducted at regional and state agencies under Section 208 with particular respect to their potential substantive contributions to developing and implementing management systems to control nonpoint sources of pollution from farmland erosion. General comments on the relationship of the 208 programs to PLUARG are made in the final section of this summary; however, some comment here specifically on the probable nature of agricultural pollution control programs proposed through the 208 process is in order. Current US EPA policy on requirements for approval of a regulatory program for agricultural nonpoint sources is expressed through a US EPA Program Guidance Memorandum (SAM - 31, Sept. 27, 1977). The memorandum notes that Section 201(c) of the Act requires control or treatment (to the extent feasible) of all point and nonpoint sources of pollution and that Section 208 (b)(2)(c) requires that regulatory programs be established to implement requirements of Section 201(c). Further, the memorandum defines the following elements as necessary for an approvable regulatory program:

(a) Authority to control the problem which the program addresses (i.e., an activity, pollutant, or geographical area).

(b) Authority to require the application of best management practices (per 40 CFR 130.2(g)) and their periodic revision.

(c) Monitoring and/or inspection authority.

(d) Authority to implement the chosen control tool(s) (i.e., permits, licenses, contracts, etc.).

(e) Enforcement authority.

(f) A designated management agency or agencies responsible for implementing the regulatory program with:

- expertise in the subject matter area to be controlled
- adequate staff
- adequate funding

- relevant authorities pursuant to Section 208(c)(2) and 40 CFR 131.11(o)

The memo states that, "to be approved, a regulatory program must have the necessary implementing regulations in effect and sufficient resources available to carry out the required activities." The memo goes on however, to describe elements necessary for an approvable "other program" for agricultural nonpoint source control. "Other programs" are in essence, voluntary programs which do not require management agencies that have full authority to compel implementation of the appropriate best management practices. "Other programs" thus provide an escape valve which allows a 208 agency to approach agricultural pollution control essentially through information/education efforts combined with technical assistance and use of fiscal incentives. The Memo notes that "[n]on-regulatory programs may be approved only where such programs will result in implementation of a nonpoint source program which will result in the achievement of desired water quality goals." The Memo also notes that "[r]egulatory programs are not required where the plan prepared under Section 208 certifies (as defined in 40 CFR 130.11(b)) that substantial water quality problems (as defined in 40 CFF 130.13(a) resulting from nonpoint sources do not exist or are not likely to develop in the foreseeable future.

Thus 208 agencies have three basic options open to them respecting their approach to control of nonpoint sources. First the agency may conclude that a water quality problem does not exist. If this can be justified to US EPA, no program, voluntary or otherwise, is necessary. Second, an agency can conclude that though a water quality problem exists, water quality goals can be met through a voluntary program. If US EPA approves this approach continuing review will have to demonstrate program effectiveness. Third, the agency can develop a regulatory program for the situations where water quality goals cannot be achieved through less stringent action. However, given the difficulty in documenting the adverse water quality impacts of agricultural runoff, the time constraints imposed upon completion of a 208 plan and the political uncertainties attendant to making commitments to new programs (see page 98) it is likely that 208 agencies will follow the path of least resistance and that in the Basin considerable use of voluntary programs will be made.

Clearly the emergence of SAM-31 is not unrelated to a recognition that regulatory programs to control agricultural runoff throughout the U.S. would be neither necessary (due to variability in extent or the problem from one area to another) nor feasible (due to local or state political resistance). SAM-31 has the advantage that it provides EPA the flexibility to require the regulatory programs in areas where they are needed while approving non-regulatory programs in areas where circumstances don't merit their immediate use. This flexibility appears to be consistent with the concept of Section 208. Further, the Memorandum makes it clear that a voluntary program which is not resulting in attainment of water quality goals will constitute grounds to conclude that the most practicable solution is a regulatory program. But SAM-31 is a two edged sword because it also provides the mechanism by which to justify only voluntary action in situations where, though problems may be severe, political opposition to regulation is strong.

The significance of SAM-31 to PLUARG, however, goes beyond this. It raises the issue of whether the substantial momentum that has developed in the U.S. since 1972 toward controlling agricultural pollution sources will be diminished by US EPA's indication that voluntary programs could be acceptable as part of a 208 program. It is difficult to conclude that US EPA, by making a voluntary option for nonpoint source control available has seriously set back efforts in some areas to establish a system that goes beyond voluntarism (e.g. the Ohio Agricultural Pollution Abatement Program as originally proposed). However, if as a result of SAM-31 the interest in a regulatory approach to control of agricultural soil erosion recedes, it would not be the first time a US EPA decision has hampered state efforts directed at improving water quality. US EPA's initial proposed regulations to prevent water pollution from feedlots were published in mid 1972 just as proposals for an Illinois program of feedlot control were being considered. Witness the following exchange between Mrs. Louise Rome, Environmental Quality Chairman, League of Women Voters of Illinois and Representative Guy Vander Jagt, Ranking Minority member, House Conservation and Natural Resources Subcommittee during November 1973 hearings on the control of pollution from Animal Feedlots:

> Mr. Vander Jagt.
> ...Mrs. Rome, I hope I did not understand correctly but maybe I did. The gist of your testimony was that under the proposed regulations that Illinois was going to adopt, virtually every feedlot operation would have been covered by the State regulations, and then, as a result of the EPA proposals, there was some back stepping; and as a result, under the regulations that did go into effect, 99.8 percent of the feedlot operations are not covered in Illinois. Did I understand that correctly?
>
> Mrs. Rome.
> ...I am part of the committee that drew up the regulations...Under the new proposed regulations 99.8 percent of all feedlots in Illinois will not be required to file for permits.

If a large number of 208 agencies in fact make a determination that the extent of agricultural pollution in their jurisdictions does not justify regulation, then the collective result of the determinations (based on stream studies) could be a problem. This could be the case if PLUARG findings (based on Lake studies) indicate that there are significant phosphorus loadings to the Great Lakes from agricultural runoff. The 208 studies have in fact tended to focus on stream impacts of pollution sources and have not addressed Great Lakes boundary water impacts. For example, consider the conclusions reached by the West Michigan Regional Planning Commission in the conduct of 208 planning in its area. The following is an excerpt from the transcript of the Public Hearings on the draft Clean Water plan prepared under Section 208 by the WMRPC.

Mr. Strobridge (WMRPC Staff):
...First the water quality modeling effort undertaken for this plan revealed no violation of State Water Quality Standards other than for fecal coliforms during wet weather attributable to nonpoint sources. The fecal coliform violation was of short duration and is not considered to be a serious problem. Second, because no state water quality standard violations due to nonpoint sources are documented, the Clean Water Plan presents recommendations and not requirements for the control of nonpoint sources of pollution. (emphasis added)

Mr. Strobridge went on to note that "...for agricultural activities, we are recommending the implementation of best management practices on a voluntary basis in cooperation with local soil conservation districts and the Soil Conservation Service." If WMRPC findings are typical of 208 studies the danger for PLUARG is that a basinwide evaluation may be accorded a low priority. The point is that PLUARG and 208 findings could be contradictory to one another yet both could be valid. In this respect special attention to this possible problem should be logically forthcoming from Region V EPA as the lead agency for Great Lakes water quality.

DRAINAGE

OVERVIEW

Water pollution from drainage works is of two kinds: silting and sedimentation during construction, and draining of contaminants into watercourses during operation.

Institutional arrangements pertaining to agricultural drains involve all levels of government, but control of potential adverse water quality impacts of drainage works has not been integral to these efforts.

CANADA

Federal

The Department of Regional and Economic Expansion (DREE) through the Agricultural and Rural Development Act (ARDA), provides partial funding for outlet and tile drainage schemes in selected portions of Ontario. The Act, on its face and as applied, does not attach environmental criteria as a precondition to assistance for such projects.

Ontario

No approval is needed under the Ontario Water Resources Act to establish or extend sewage works whose main purpose is to drain agricultural lands, or for drainage works under the Drainage Act. Provincial involvement in such schemes (through OMAF), has recently been exempted from the provisions

of the Environmental Assessment Act. Under Section 6 of the Drainage Act (administered by OMAF), if a municipality, local Conservation Authority or the Minister of Natural Resources requests that an environmental appraisal be performed, it must be undertaken. However, the cost of such an appraisal must be paid for by the party who requested it. This provision is in contrast to the Environmental Assessment Act under which the proponent of an undertaking must pay for its assessment. The Drainage Act also provides grant assistance for drainage works including drain cleanouts, but not for regular drain maintenance.

Trend

The existence of Section 6 of the Drainage Act and the Environmental Assessment Act exemptions notwithstanding, it is arguable that over the long term proposed municipal drainage works could become subject to the provisions of the Environmental Assessment Act. The question of whether these projects will be subject to class (i.e. non-site specific) or individual environmental assessments remains moot for the present.

UNITED STATES

Federal

Federal role in this area primarily involves provision of technical and financial assistance for construction of open drains, field ditches and sub-surface tile drains. The National Environmental Policy Act requires that an environmental impact statement be prepared for any federal project or federally financed project where environmental effects are likely to be significant. Under federal regulations, drain maintenance projects have been exempt from Corps of Engineers' section 404, dredge and fill permit requirements (PL 92-500). Section 65(f)(3) of the 1977 Clean Water Act makes this exemption statutory.

State

All the Basin states except Pennsylvania have laws which provide for the establishment and maintenance of agricultural drains through local entities or special purpose districts. With respect to water quality protection however, there are no requirements for prior approvals for drainage improvements. Minnesota, Wisconsin, Michigan and New York have authority to limit discharge of pollutants to public drains under state drainage statutes.

Minnesota and Michigan have right of action statutes which allow citizens to bring action to enjoin any proposed or current project if adverse environmental effects can be shown to be likely. New York's Environmental Quality Review Act requires an environmental impact statement for actions which may affect the environment. However, amendments to the act exempt all projects except large scale developments and state public works projects.

Trend

Current activities in this area are primarily limited to maintenance work on existing drains ranging from cleaning and snag removal to major

earth changes through channel straightening or enlargement. The extent to which environmental issues are taken into account in planning and construction of drainage projects is not likely to change.

OBSERVATIONS

From the above discussion it is apparent that in Canada DREE is providing partial funding for agricultural outlet drainage schemes that would appear to be receiving inadequate pre-environmental scrutiny at the provincial level.

It is also evident that in Ontario the policies underlying the provisions of the Drainage Act and the Environmental Assessment Act belie a fundamental divergence of opinion within the province as to how - or whether - to control the adverse environmental impacts of proposed drainage works. The reasoning implicit in the Environmental Assessment Act process is that he who stands to gain most from the undertaking should bear the cost of assuring that his gain is not the wider community's loss. The Drainage Act provisions, however, stand this notion on its head by requiring that the funding for an environmental appraisal be undertaken by an agency other than the proponent of the drain project. Such an approach may provide a serious constraint to the systematic environmental review of drainage proposals where agencies lack sufficient funds to request and support an appraisal.

That environmental review of such projects may be necessary is suggested by recent studies on the subject. One study which investigated the pre-project planning, construction practices and induced changes of a half-million dollar municipal drain project in the Dundalk Plateau, Ontario concluded that the project was based on inadequate planning and that poor construction practices led to unforeseen environmental damage.

In both Canada and the U.S. drainage improvements which may cause pollution problems are carried out nearly exclusively by public entities. Government self-regulation through proprietary action would appear to be an appropriate strategy to integrate water quality concerns into this land use activity. However, the mission orientation of many special purpose agencies with drain improvement and maintenance responsibilities, often to the exclusion of explicit environmental responsibilities, creates an incentive within these agencies to short circuit use of environmentally sound practices in favor of practices that promote attainment of objectives at lowest possible cost or with least possible delay to the agency.

In light of the above, general purpose environmental protection legislation such as right of action statutes (Michigan, Minnesota) or environmental impact review statutes (Indiana, Minnesota, New York, Wisconsin, Ontario, NEPA) provide a mechanism to externally influence agency practices.

As a means of routine environmental protection, however, such measures are cumbersome and likely to bring relief only in cases where projects are particularly controversial. An approach utilized in Michigan to assure public agency compliance with soil erosion control requirements (the "Authorized Public Agency" mechanism under Michigan's Soil Erosion and Sedimentation Control

Act of 1972) could be applied to agencies which undertake drainage improvements by requiring by statute that they have an approved program for control of erosion and sedimentation during construction. Such an approach could provide the legal incentive to the operating agency to engage in a control program that would specifically address erosion and sedimentation problems unique to each site.

This site by site review is not unlike the 1974 recommendation of the Legislative Assembly of Ontario Select Committee on Land Drainage. The Select Committee recommended that an environmental impact statement on every new drain proposal should be filed with the council of the municipality in which the drain is to be built. The Committee appeared to have made this recommendation out of the recognition that the cumulative effect of a number of small drainage projects, each of which has only a minor effect on the environment, may still be quite serious.

Control measures for the operation of drains were a subject of attention in the Ontario Thames River Study. As a water management option, it was suggested that an interministerial committee be formed to study a number of topics including: "the operation and maintenance of municipal drains and the quality of municipal drain effluent to determine the most suitable means of maintaining them free of obstruction and pollution".

It has been suggested that the present grant structure of the Ontario Drainage Act is not conducive to the control of sediments within drains or recipient watercourses. Drain cleanouts are regarded as increasingly expensive. Reducing the frequency of cleanouts by employing a regular maintenance schedule, it was argued, would appear to be a logical control mechanism, as well as more economical in the long run. However, while the Drainage Act provides financial assistance for cleanouts, it does not do so for regular maintenance.

LIQUID, SOLID, DEEPWELL DISPOSAL AREAS

SOLID WASTE DISPOSAL

OVERVIEW

Over the last decade regulatory programs which address the design, location and operation of sanitary landfills have become centralized at the state/provincial level. Questions of hazardous waste disposal, resource recovery, waste reduction and integration of solid waste management into land use planning have only recently emerged and have been reflected to varying degrees in existing state/provincial and local solid waste management programs.

CANADA

Federal

There is no federal law respecting control of solid waste disposal, except for those sites on federal land or that form part of radioactive

waste management activities. In theory the Fisheries Act gives the federal government jurisdiction to protect fish habitat and waters frequented by fish from toxic leachates from sanitary landfill sites on non-federal lands as well. This could be done through prosecutions or through Ministerial orders requiring submission of plans and specifications respecting such works or undertakings. In practice this does not occur because such federal action would parallel or duplicate provincial controls. Duplication of control is regarded as administratively undesirable though in certain circumstances federal action could be important where the province, for whatever reasons, cannot or does not act.

A 1972 federal cabinet directive on pollution abatement from federal facilities authorized establishment of a controlled allotment clean-up fund for use, in part, in closing or upgrading federal disposal sites that are or have been pollution problems. Typical problems at such sites include or have included: open dumping, leachate migration and pollution of surface and groundwaters. Recent voluntary (non-statutory) codes of good practice for federal facilities have also been promulgated.

Selected federal studies have also been undertaken to evaluate resource recovery and sanitary landfill options where such approaches would service not only federal facilities but financially constrained municipalities as well. These are situations where municipalities might otherwise only be able to afford disposal.

Similarly, Fisheries and Environment Canada and the federal Office of Energy Conservation have supported studies and selected projects which seek to ensure that a secondary use for some solid wastes is found. Such projects include: waste paper recycling; use of solid wastes as a fuel for incinerators at certain federal establishments; and support for local at-home source separation.

Ontario

Provincial control of solid wastes disposal is authorized under the Environmental Protection Act (EPA). Such sites require a certificate of approval before they may be established and must also conform to specific operation and location requirements under EPA regulations. In addition, a public hearing is required before the issuance of the certificate of approval where the waste management facilities will service the equivalent wastes of not less than 1,500 people as determined by the province.

The province took over responsibility for control of waste disposal sites in 1970. Since then over 500 substandard sites have been closed. Some sites with water quality problems continue to operate under Ministry of Environment approval.

Since 1972, the province has also been encouraging county and regional waste management area planning studies by the provision of a 50% provincial grant. Consolidation of a large number of landfill sites into a

few central treatment facilities is expected to result from this process. These facilities will be designed to be converted in stages to resource recovery, rather than remain merely disposal sites, as reclamation processes and equipment become practicable.

The companion resource recovery program enables the province to provide capital funding for the construction of front-end resource recovery plants, excluding the cost of land. Committments have been made to six regional municipalities or cities for the establishment of front-end plants and centralized facilities. Participation in such programs is at the discretion of municipalities, as the program is non-statutory.

Under regional legislation, regional governments, with some exceptions, normally own all waste disposal sites within their geographic area and are responsible for their management, operation and maintenance. Most regional governments have undertaken studies to determine their short and long-term solid waste management options. Several regions are currently participating with the province in considering or undertaking aspects of resource recovery.

Municipalities

Municipalities may control the use of land for waste disposal purposes. Municipal disposal by-laws are subordinate to provincial law and in practice tend to supplement the more comprehensive provincial program.

One or two municipalities have attempted modest initiatives in the direction of solid waste reduction, by enacting by-laws or seeking special legislation prohibiting the sale within their jurisdictions of carbonated soft drinks in non-returnable containers. However, at least one municipality has had its by-law judicially quashed on the grounds that it is contrary to the provincial EPA regulations.

Trend

Federal involvement in solid waste management is not likely to depart significantly from current activity levels. The area of solid wastes has traditionally been regarded as one of primarily provincial and local jurisdiction. This view, with some exceptions, is likely to hold despite some federal agency acknowledgement that the growing volume and toxicity of solid wastes is a national problem.

Certainly in the short-term it is unlikely that the federal role will go much beyond that of technology development, demonstration and information transfer. Greater federal involvement in the area of resource recovery could be envisaged to the extent that local and regional governments continue to perceive the financial aspects of waste management favoring landfill over resource recovery. In such circumstances federal involvement might be seen to properly include the improvement of markets for reclaimed materials through taxing or other measures of fiscal influence.

A projected development of subsequent stages of the provincial resource recovery program over the next 10-15 years is the reduction in the need for

sanitary landfill sites. This reduction is contingent on the satisfactory development of back-end resource recovery processes which are currently regarded as unproven.

UNITED STATES

Federal

Full implementation of the Federal Resource Conservation and Recovery Act (RCRA) will bring about changes in the solid waste management programs of several states. Therefore, present variability from one state to another regarding effectiveness and extent of different program elements is not of major long-term significance. Major elements that RCRA will require states to address are elimination of open dumping, operation of landfills and control of hazardous waste disposal.

US EPA is now in the process of developing regulations which provide criteria for distinguishing between sanitary landfills and open dumps. The Act states that "at a minimum such criteria must provide that a facility may be classified as a sanitary landfill and not an open dump only if there is no reasonable probability of adverse effects on health or the environment from disposal of solid waste" (Sec.4004(a) PL 94-580). Subtitle D of the Act requires that states must provide for the closing or upgrading of all existing open dumps (as defined by US EPA criteria) within the state. In instances where no waste disposal alternative exists a maximum of five years from publication of US EPA's open dump inventory (to be published by October 1978) is allowed before a dump must either be closed or upgraded.

Subtitle C of RCRA provides for a national program of hazardous waste management which will require the identification and tracking of wastes through a manifest system as they move from point of generation to final disposal. Regulations to be published by US EPA will cover all persons responsible for generating, hauling, treating, storing or disposing of any identified hazardous waste. No treatment, storage or disposal facility will be allowed to accept hazardous wastes except with a permit to do so. States with hazardous waste management programs which meet US EPA standards may administer their own program within the state jurisdiction. This arrangement is similar to that involving the NPDES permit program under PL 92-500.

RCRA also specifically requires that federal solid waste disposal facilities meet all state and local procedural and substantive requirements.

Areawide water quality management planning agencies under Section 208 are required to identify water pollution problems associated with solid waste disposal and to define programs to control such pollution as appropriate.

State

All states in the Basin operate regulatory programs which require the licensing of disposal sites, the operators of such sites and public and private solid waste haulers. Monitoring of ground and surface water quality for leachate contamination is not a component of regulatory programs in all states but in many instances it can be required. Programs in several states require submission of local solid waste management plans. All states are working toward the closing of active open dumps so that all local disposal operations utilize sanitary landfills or other approved methods.

State programs tend to be adequate with respect to requirements that new landfills are located, designed and operated in an environmentally sound manner. Areas where controls are less complete, or where staff and funding limitations hinder adequate control, are the monitoring of older landfills (where planning and design may not have been up to current standards) and identification (and subsequent elimination) of problems of leaching from closed and abandoned dumps.

Trend

Operation of solid waste disposal facilities is increasingly becoming an activity carried out by local or regional agencies. New landfills tend to be larger and serve larger populations.

Management of solid waste disposal at all levels of government is undergoing considerable transition. In the last 10-15 years control of solid waste disposal problems has shifted from a primarily local function through county and municipal health departments to an activity of state/provincial government. In the U.S. while these state programs were being developed and refined, federal legislation was passed which calls for state and areawide planning and sets minimum requirements for many aspects of solid waste management.

OBSERVATIONS

In both countries, increasing waste generation by the public and industry combined with the lack of a comprehensive waste reduction program at federal and state/provincial levels, can result in foreclosing certain provincial/state approval and enforcement options. This can have obvious water quality implications. Until such time as reclamation initiatives significantly reduce the amount of wastes generated, the province and the states will continue to be in the position of approving waste disposal operations which, though better designed and located than they were in the past, still have the potential for causing problems such as leachate contamination. As such, provincial/state approvals will, at times, appear to authorize prima facie violations of statutory water quality impairment prohibitions. The same may be said for approval of site expansions and continuation of existing sites.

In Ontario older municipal official plans have frequently permitted waste disposal facilities in environmentally inappropriate areas. Newer plans, especially at the regional level, are better in this regard. However, regional plans are sometimes not sufficiently specific in forbidding certain land uses (e.g. waste disposal activities) in certain areas (e.g. environmental sensitive areas). This deficiency combined with antiquated local zoning, can defeat efforts to prevent a waste disposal facility from being located in a place where it may damage water quality. Provincial enabling law which permits municipalities (especially the larger ones) to export their solid waste to another municipality may also exacerbate this problem. In the United States at the local level a largely parallel situation prevails although the specific institutions differ.

Further difficulties for water quality in Ontario can occur because environmental approvals and land use planning decisions for waste disposal sites are made by separate hearing boards under separate pieces of legislation.

In the United States the statutory base for a national solid waste management program appears to be now in place through RCRA however, the intergovernmental, political and economic issues attendant to its implementation have generally not yet emerged. US EPA sources indicate that financial resources committed to the program at the federal level have been limited.

RCRA specifically requires all federal facilities to comply with state and local procedural and substantive requirements. The states have argued that federal facilities should meet procedural as well as substantive requirements. They have taken this position because without a requirement for federal agencies to file for a permit or to submit specified reports, it would be impossible for the states to evaluate the extent of the facilities' compliance with substantive law. That such procedural compliance may be desirable is evidenced by a 1972 General Accounting Office investigation which found "open burning and open dumping on federal lands to be widespread". Of 651 solid waste disposal sites within the scope of the study, 91% failed to meet federal standards (applicable at that time) for sanitary landfills; over 60% were open dumps. Of the 131 sites actually visited 24 were dumps in contact with groundwaters, streams, lakes or swamps (see also LIQUID INDUSTRIAL WASTES respecting other inputs to landfill sites).

LIQUID SEWAGE SLUDGE

OVERVIEW

Increasing population, more efficient wastewater treatment processes and rising standards for environmentally safe disposal characterize the current sludge management situation. To a large extent the institutional arrangements for sludge management have not demonstrated a capacity to systematically cope with this problem.

CANADA

Federal

Federal lands, such as those associated with airports, have been sources of water contamination from sludge spreading practices. There is no federal legislation to control spreading practices on federal lands or property. Reliance is placed on voluntary compliance with good management practices.

Under the 1971 Canada-Ontario Agreement on Great Lakes Water Quality a sludge disposal subcommittee from Environment Canada and the Ontario Ministry of Environment was established as part of the research program for the abatement of municipal pollution. The terms of reference of the subcommittee include providing advice and direction in the development of a research strategy in the area of application of sewage sludge to land; reviewing research proposals and assessing their implications; providing guidance and maintaining contact with groups concerned with environmental quality aspects of sludge disposal on land.

The principle concerns of the subcommittee include the balance, movement, and fate of nitrogen compounds to water, as well as the level of heavy metals in sludge, because of potential problems associated with pollution of surface runoff, plant uptake of metals, soil destruction, and pollution of groundwter due to leaching.

Ontario

The province, under the authority of the EPA, controls the handling and application of sewage sludge to agricultural lands by site and system approvals and regulations. Non-statutory guidelines on sludge application have been under development for a number of years for use in conjunction with the above measures. These guidelines address such issues as site location and management, land characteristics and sludge application rates.

Under the EPA, sludge transfer stations are subject to environmental assessment board hearings before government approvals are issued, though the application of sludge to land sites is not subject to this hearing requirement.

An applicant for a site approval may also request the Minister of Environment for a hearing by the Environmental Assessment Board to review whether municipal by-laws that affect the location or operation of disposal sites should apply to the particular site in question. At the conclusion of the hearing the Minister has the authority to grant an exemption from the municipal by-law.

Regional governments may acquire and use land within their region for waste management, including sewage sludge, storage or disposal purposes, and may erect, maintain and operate all facilities or contract with any person or the province to do so; and are further authorized to prohibit or

regulate the disposing of waste upon such land and may charge fees for the use of the land.

Municipalities

Municipalities, through their by-laws, may also regulate or prohibit sludge disposal.

UNITED STATES

Federal

The major federal programs related to disposal of sewage sludge are administered by US EPA. Under Section 201 of PL 92-500 facilities plans for new or expanded wastewater treatment works must identify how residuals generated by the treatment process will be disposed of. Costs of planning for sludge management are eligible along with other treatment plant planning costs as part of the facility construction grant. Section 208 under the same law calls for designated state and areawide agencies to develop a process for identifying sludge disposal problems and to define controls for pollution from sludge disposal where appropriate. The Resource Conservation and Recovery Act of 1976 (RCRA), is a major new law addressing the larger solid waste management issue. Sewage sludge disposal, as a major component of a solid waste program will receive increasing attention as state and local government adjust their programs to meet requirements of the Act (see SOLID WASTE DISPOSAL).

State

Current state controls on sludge disposal address various components of the sludge disposal problem. Some states utilize guidelines for land application of sludges and operation of sludge handling facilities. Other states have requirements for licensing of sludge haulers. Ohio requires permits for land application of sludge. Wisconsin requires each treatment plant to prepare a sludge management plan under administrative rules adopted by the Department of Natural Resources.

Sub-State

Sludge disposal operations are largely the function of municipal wastewater treatment agencies. Disposal is carried out as part of the plant operation but can range from simply making the dried sludge available for voluntary pickup by farmers and horticulturalists at small treatment facilities to more complex and costly arrangements for landfilling, land spreading or incineration at large facilities. Where landfilling or land application of sludges is involved, interjurisdictional land use disputes often develop due to undesirable consequences of being near a sludge disposal operation.

BASIN-WIDE TRENDS

The general situation on both sides of the border, with some exceptions, appears to be lack of an overall approach to sludge management:

Inadequate information on how much sludge is generated (more a problem on the U.S. side); inability to account consistently for where sludge goes; and lack of assurance that disposal is environmentally acceptable.

OBSERVATIONS

A major obstacle to implementing a set of sound statewide programs for sludge management is the lack of information. First, lack of complete or consistent research data as to the effects of land application of sludges over time and on human health may adversely influence the effectiveness of land disposal site approvals. Second, records are not being consistently kept on existing practices with the result that impacts of disposal will be difficult to identify and accounting for where all the sludge ultimately goes is simply not possible.

In Ontario, the large volumes of land spreadable sludge that are generated by treatment plants and the small number of approved sites suggests that haulers are spreading or dumping sludge in environmentally inappropriate and unapproved areas. This view is also supported by the fact that there is a large discrepancy between records of where sludge is going versus the total amounts of sludge that are generated by all sewage treatment plants that have land spreadable sludge. Lack of sufficient field personnel also adversely affects the province's control program.

A precondition for an adequate regulatory program for sludge disposal would be the implementation of a record-keeping system which requires sludge generators to identify and report quantity, content, and characteristics of sludge produced sites utilized for disposal. The hazardous waste manifest system established under Subtitle C of RCRA provides a model approach that could be adopted as a regulatory program for sludge disposal. A key factor in any program adopted must be the clear assignment of responsibility for identification of basic data and assurance of appropriate intermmediate handling and ultimate safe disposal or reuse.

In Ontario, though sludge transfer stations are subject to environmental assessment board hearings before government approvals, the application of sludge to land sites is not. Thus, neither the sufficiency of the new sewage sludge guidelines, nor the soil conservation practices of farmers accepting sludge, has been adequately reviewed by the board.

Where regional governments have been established in Ontario, they generally do not retain responsibility under provincial law, for where sludge goes after they contract with a sludge hauler for its removal or transfer from regional facilities. This may further burden provincial agency policing of sludge disposal practices.

More extensive land application of sludge to farmland could be viewed as an indirect incentive to gain better farmer land management practices responsive to agricultural erosion control. This could result from a greater public concern that the effects of runoff from lands where sludge has been applied would not be tolerable. On the other hand, such a program could work to the detriment of farmland erosion control. Farmers might cease to accept, or at least reconsider accepting, sewage sludge if they were

then compelled to engage in better soil conservation practices. (This is quite apart from the farmer's own legitimate concerns about crop uptake of heavy metals from sludge).

It is conceivable that a regulatory mechanism could be designed that is relatively free of loopholes and yet ineffective in protecting water quality. For example, additional fragmented efforts aimed at regulation of various aspects of sludge disposal may not ultimately solve the sludge problem regardless of how well thought out such programs may be. A major contributor to the weak regulatory posture in sludge disposal is the lack of facilities for adequate disposal. Until additional safe disposal sites for sludge are established and put into operation new piecemeal regulatory efforts will be of little effect.

Sludge disposal is a distinct component of the larger solid waste management problem. It could be argued that state/provincial statutory requirements for comprehensive sludge management as part of local residual waste planning would be an improvement over isolated approvals that are narrowly directed to certain facets of sludge disposal practices. For example, the MOE has frequently deplored municipal by-laws that prohibit sludge spreading. This is evidenced by the Minister's capacity, under the EPA, to set aside municipal by-laws that affect particular sludge site location and operation. However, this MOE approach, while providing a means of solving disposal site location needs, doesn't provide a systematic mechanism respecting area-wide sludge management.

PRIVATE SEWAGE DISPOSAL

OVERVIEW

According to the PLUARG Task B Joint Summary Report private sewage disposal systems (typically a septic tank used in conjunction with a soil absorption field) are the sole means of sewage disposal for at least 20% of the population of the Basin. Responsibility for management of these systems is divided among several entities. Operation and maintenance is with only a few exceptions, the exclusive function of the individual system owners. Local health departments review installation procedures. Land use planning and development designation are the function of agencies separate from those responsible for control of new system installation. General responsibility for protection of surface and groundwater quality lies at the state or provincial level.

CANADA

Ontario

Under the Environmental Protection Act, Ontario licenses the haulers and installers of private sewage systems and requires a certificate of approval before a system may be installed and a permit before it may be operated. A licensed sewage hauler must also obtain a Certificate of Approval and permit for the specific task of hauling sewage to each disposal

site he uses in his business. The licensing of haulers and installers remains a Ministry of Environment (MOE) responsibility. The issuing of approvals and permits has been delegated to local health units under agreements with the province. The Act and regulations are silent on control of nutrients from septic tank-tile field systems, though fifty-foot setbacks from bodies of water are required.

Since 1970, MOE has been conducting an annual cottage pollution control survey to detect and correct problems from private sewage systems.

Several studies and planning manuals have been or are being developed by provincial agencies as tools for assessing and controlling water pollution from lake recreational development.

The Lake Capacity Study is an interministerial undertaking (Ministries of Housing, Environment and Natural Resources) which is currently devising a method of forecasting the total environmental effect of recreational cottage development and related activities on lake water quality. For example, if fifty to one hundred new cottages were permitted on a lake of a certain size, the study would attempt to project the short and long-term impact on the lake for such purposes as fishing or swimming as a result of nutrient loadings from additional septic tanks.

It is expected that a model or matrix will be developed measuring approximately seventy land/water parameters. This scheme will likely be utilized under the Planning Act whereby the Ministry of Housing will be able to determine in consultation with other agencies and reference to the lake capacity model approximately what level of recreational development may be appropriate for the particular lake.

The Lake Planning Manual of the Ministry of Natural Resources is designed to perform a similar function on lands that are primarily owned by the Crown (i.e. public lands).

UNITED STATES

Federal

The major federal influence on private sewage disposal has been the Manual of Septic Tank Practice published by the U.S. Public Health Service. The manual, which deals exclusively with septic tank-leaching field systems for individual sewage disposal has become a standard field reference over the years relied upon greatly by local health departments and those engaged in installing new systems. A new publication intended to replace the manual is now being contemplated by US EPA. The new manual will address alternatives to the septic tank and also discuss approaches to management of decentralized systems.

Other US EPA involvement in this area is through the 208 program (discussed elsewhere) and through the construction grant program under Section 201 of PL 92-500. The spiraling costs of providing conventional sewage treatment in low density areas and in small communities have prompted a re-evaluation of federal policies. This is most evident in the construction

grant program under Section 201. The 1977 Clean Water Act amends Section 201 to make septic tanks or other individual treatment systems eligible for construction grant funds provided application is made for such funds by a public body which will certify proper operation and maintenance of the individual units. Through program policy and guidance US EPA is encouraging 208 agencies to examine the problems of wastewater treatment in low desnity areas on an areawide basis to determine where on-site systems will remain as the best practical approach to treatment. In those areas guidelines call for 208 plans to specify management arrangements to assure on-site sewage disposal does not prevent meeting water quality goals.

State

In all states control of installation of new on-site sewage disposal systems is delegated to the local health departments (generally at the county level). Generally the state health departments provide technical assistance and guidelines to the local programs. In Minnesota, Indiana, and Ohio mandatory statewide standards establish the basis for health department approval of private sewage disposal systems. In the remaining Basin states individual health boards may adopt their own standards but tend to follow state guidelines. No important differences in water quality as a result of these two approaches emerged from the U.S. Legislative Review.

The only state in the Basin that has integrated pollution control (in this case with respect to permit issuance for on-site sewage disposal) with planning for waste disposal is Pennsylvania. The Pennsylvania Sewage Facilities Act requires each municipality to submit an officially adopted plan for sewage systems within its jurisdiction to the State Department of Environmental Resources. Each plan must identify existing sewage systems in detail, proposed sewage systems (within the next 10 years) and where no systems exist or are proposed, the plan must include a land classification system to prevent installation of on-site sewage disposal systems where soils are not suitable. Provisions are made under the Act for grants to help with such planning. Pennsylvania also conducts a certification program for sewage enforcement officers.

Sub-State

Control of private sewage disposal systems is primarily through programs of local health departments which issue permits for installation of new systems and document instances of system failure. In situations where failing systems create health or water pollution hazards the health departments can issue orders to abate the problem. Health department recommendations generally call for installation of public sewers although replacement of deficient systems is also an option if site conditions are such that adequate system performance could be reasonably expected. The problem is that many systems have been installed in locations where their long term effective operation is unlikely due to poor soil or high water table conditions. To aggravate this situation, proliferation of development creates land use densities in excess of those initially seen to be appropriate for many suburban areas.

A 1975 report prepared by the Bay County Health Department, Bay County, Michigan illustrates this situation. The report noted:

> Quite some time ago this department became aware of the fact that sewage problems have arisen along State Park Drive due to heavy soils, high density development and poor drainage of this area. As such sewage problems arise at the respective dwelling units, the residents have found it more advantageous to tie their failed septic systems into the drain that runs along State Park Drive and eventually discharges into the Kawkawlin River.
>
> Based on the data collected during the sampling procedure (which revealed fecal coliform counts 'too numerous to be counted' by Department laboratory staff) it is strongly recommended that Bangor Township officials and Bay County Commissioners address themselves to the fact that sewage is entering surface water drains in and along State Park Drive, and that... the replacement of individual sewage disposal systems... is not the long range answer to the existing problem. Rather this department would promote the idea of a municipal sewer collection system....

The failure of local planning and zoning boards to seriously establish and enforce local land use policies in many urbanizing areas has resulted in the de facto delegation of land use planning authority to the county sanitarian by virtue of his role in issuing permits for new private sewage systems.

BASIN-WIDE TRENDS

In both countries issues pertinent to improving the management of private sewage disposal systems do not yet appear to be clearly enough drawn to conclude that any significant departure from present practices will occur. In some areas new management arrangements will be explored to address problems of owner operation and maintenance and high costs of extending public services to low density areas with failing systems.

In Ontario it is anticipated that The Planning Act will be used in conjunction with lake capacity models to measure the capacity of water bodies to absorb development and pollution from private home sewage systems. Control and correction of existing problems from septic systems will be limited by available funds to conduct surveys. In addition, the effectiveness of private sewage approvals in controlling nutrient, as distinct from bacterial, pollution will come under increasing scrutiny.

OBSERVATIONS

An important initial step in improving management of private sewage disposal would be a clarification of the basic responsibility of individuals to provide adequately for the environmentally safe disposal of their waste. There is no link between the owner and the local health department to assure that failed systems are identified and dealt with in a timely manner. This is the case notwithstanding the establishment of criteria for failed systems

by responsible agencies. A system generally is considered to be failing if it is not adequately treating the wastewater effluent. In practice identifying these failures is difficult. Often failure of a system is not declared until it becomes hydraulically in-operable with effluent backing up into household plumbing or by surfacing above or around the soil absorption field.

The three major problems with respect to management of on-site systems appear to be:

(1) The lack of effective local health department programs to provide assurance of the continuing sound operation and maintenance of on-site systems and to identify system failures due to incomplete treatment of wastes.

(2) The weak position of local health departments in denying permits for septic tank systems when faced with strong economic and political pressure to allow development. In the face of this pressure, health departments are often unable to cite conclusive evidence that installation of one additional septic tank system in a particular area would cause pollution problems.

(3) The lack of a satisfacotry linkage between approvals of septic tank installations and development planning.

Programs in some counties which require individual renewable operation permits or periodic inspections could provide a model approach to improving management of on-site systems. The focus of a local health department review of operation and maintenance should be to assure regular pump-outs and to assure that illegal modifications (off-site discharges) are not made on old installations as a means of avoiding system failure.

Another approach which has been tried is Ontario's annual Cottage Pollution Control Program to survey and correct problems from private sewage systems. These surveys reveal that many such systems are inadequate. However, there are problems with this program. For example, while remedial and enforcement activity is undertaken where problems are identified the great number of cottages in the province (estimated at 250,000) and the relatively small number of cottages surveyed annually (approximately 5,000), suggests that, given current funding, it will be the year 2020 before all existing cottage systems are reviewed and deficiencies corrected.

In Ontario, the consolidation into the EPA of authority for control of private sewage systems is regarded by some local health units as an improvement over previously fragmented regulation. The requirement of licensing haulers and installers is also regarded as an improvement.

However, there appear to be a number of problems which persist surrounding the basis and parameters of local health unit approvals. These difficulties relate to the question of whether provincial EPA regulations and the approval criteria of health units are adequate for controlling pollution, not only from bacteria but, from nutrients as well.

First, it is clear that both nutrients and bacteria must be dealt with in relation to sewage system approvals. The Ontario Ministry of the Environment Guidance Manual for inspectors of private sewage systems indicates that "the primary concern of health authorities and ecologists is the presence in sewage of toxic elements, disease carrying bacteria and nutrients in the form of nitrogen and phosphorus compounds". Indeed, the manual goes on to note that "while sewage causes environmental deterioration, due to the decomposition of its organic matter, of greater importance from the environmental point of view is the deterioration it causes by the addition of nutrients to the receiving waters....Of the nutrients in domestic sewage it is generally believed that the phosphorus compounds are the important ones."

Second, phosphorus appears to be the nutrient which most determines waterbody development capacity. Strains on further development because of such nutrient enrichment and suspended algae growth are already reported, for example, in the Kawartha Lakes area of Ontario.

Third, the efficiency of the septic tank-tile field system for phosphorus removal is coming under increasing scrutiny by the scientific community. For example, Dillon in his Manual for Calculating the Capacity of a Lake for Development indicates that "in Precambrian areas, typically having very shallow, coarse-textured sandy or muck soils there is no satisfactory evidence which indicates that phosphorus is retained in the soils. Therefore, it must be assumed that all phosphorus discharged to soils of a tile bed area eventually gains access to the lake. In sedimentary areas, septic tank-tile field systems located in sand, gravel or muck areas are likely to be as ineffective as far as phosphorus retention is concerned as those on systems located on the Shield. Lakes surrounded by clay or clay-loam soil, however, will be provided with some measure of protection."

Against this background may be contrasted, at least in certain instances, the septic system approval practices of local health units. For example, local health units, as well as consultants who prepare reports on soils and septic systems as background for approvals, frequently note that the EPA regulations are silent on control of nutrients. As a result, consultants and local health units have been known to disregard improper soil types for phosphorus removal, in recommending sites for septic systems. At the same time, some local health units admit to having no expertise with respect to phosphorus control. They have traditionally been concerned primarily with control of bacteriological pathogens, and thus, it is not surprising that they continue to emphasize that concern in their septic system approvals.

Indeed, this is also reflected in health unit requirements where fill must be imported because of high groundwater. A type of fill many health units will recommend is of the sand/silt variety. As noted above, debate in the scientific community suggests that this type of soil may not be the best for phosphorus removal. The presumption is that local health units prefer this type of soil primarily for reasons of bacterial control.

As noted above an additional problem is the need for an improved linkage between approvals of septic tank installations and planning for

expansion of public sewer systems. Currently permits for private sewage systems are issued without regard to their future collective impact on community development. Dense developments with failing systems have frequently been the cause of water quality problems which require the extension of public sewers for their correction. In some cases, land use planning tribunals have been responsive to the need to limit development to the carrying capacity of lakes and watercourses. For example, at least one recent decision of the Ontario Municipal Board (OMB) reversed a subdivision consent by local authorities which, if approved, would have contributed to increased lake nutrient pollution because of cottage over-development. The OMB concluded that land use planning on an already polluted lake may require a greater standard of control to prevent further deterioration of the lake, even where local authorities were otherwise satisfied with the application. However, development planning decisions frequently permit growth in otherwise similar situations.

The Pennsylvania program could be considered a sound model approach to integrating planning for public sewage systems with development dependent upon private sewage disposal. For situations where sewer extension is not feasible yet failing septic tanks are causing nonpoint pollution problems states should be assisting and encouraging the establishment of on-site wastewater management districts or other institutional arrangements. Such districts can correct on-site system problems through operation and maintenance services and through selective replacement of failing systems with a treatment system appropriate to environmental conditions of each site. Experience in some areas outside the Basin indicate that public provision of these kinds of services can eliminate the need for central sewage treatment systems.

LIQUID INDUSTRIAL WASTES

OVERVIEW

Nonpoint discharges of industrial wastes through landfill leaching, seepage from industrial waste lagoons, deepwell disposal, and on-site spills have not been systematically controlled by existing regulatory mechanisms. The problem is made more acute by recent pollution incidents involving persistent organic chemicals and other wastes which may have substantial long-term impacts even though concentrations may never exceed low levels.

CANADA

Federal

There is no federal regulation respecting the handling and disposal of toxic or hazardous liquid industrial wastes. Prospectively, under the Environmental Contaminants Act, restrictions are anticipated on the use, handling and disposal of selected substances such as persistent organic chemicals and wastes (e.g., polychlorinated and polybrominated biphenyls).

A federal code of good practice for management of hazardous and toxic wastes at federal facilities is under development. However, this code is of no legal effect.

Ontario

A certificate of approval and a public hearing are required under the EPA for a waste disposal site for hauled liquid industrial or hazardous waste or any other waste that the MOE ascertains is equivalent to the domestic waste of not less than 1,500 people.

Sites for the disposal of liquid wastes into geological formations by means of a well must be approved as a waste disposal site pursuant to Part V of the EPA. An approval given or made under the Petroleum Resources Act, 1971, or its predecessor Acts or regulations, is deemed to be a certificate of approval under Part V of the EPA, and is permitted to continue in force according to its terms. MOE may amend or revoke the approval in accordance with the EPA and its regulations.

No deepwell disposal site may be located so as to allow any liquid industrial waste other than brine to be discharged into certain geological formations. These formations are collectively known as the Detroit River Group.

Recent EPA regulations require the generators and haulers of liquid industrial wastes as well as the operators of disposal facilities to provide information to MOE respecting the nature and quantities of such wastes that are generated and disposed.

MOE has also recently introduced guidelines to restrict the amount of polychlorinated biphenyls (PCBs) in waste oil used to control dust on unpaved roads. Waste oils in storage for purposes of road oiling will be subject to sampling and analysis by MOE. Where waste oils are found to have PCB levels above 25 ppm they will not be permitted for use in road dust control. These guidelines, however, are not specifically authorized by statute or regulation.

Municipalities are also permitted to regulate or prohibit liquid industrial waste disposal into landfill sites under their by-laws.

UNITED STATES

Federal

The major federal program which will impact industrial waste disposal is the hazardous waste manifest system established under Subtitle C of RCRA. US EPA will remain responsible for program review and evaluation but each state, upon approval by US EPA can administer and enforce the manifest system within its jurisdiction.

Also of significance is the Safe Drinking Water Act of 1974, which requires regulation of underground injection which may endanger underground drinking water sources. The provisions of the Act are intended to produce

a federal/state cooperative effort which is based on federally set minimum standards and regulations administered by the states. The practices to be covered under the Act include deep and shallow waste disposal wells.

Section 311 of the Federal Water Pollution Control Act Amendments of 1972 (as amended by the 1977 Clean Water Act) deals with oil and hazardous substance liability. This Section is most relevant to offshore and vessel discharges although it has some application to land based discharges Section 311 provides US EPA authority to designate hazardous substances which, when discharged (including as a result of a spill), present an immeninent and substantial danger to the public health or welfare. Although no hazardous substances have been yet so designated (as of early 1978), US EPA has published a proposed list of 300 chemicals. Section 311(c) requires a National Contingency Plan for efficient, coordinated and effective action to minimize damage from oil and hazardous substance discharges including containment, dispersal and removal of oil and hazardous substances.

The 1972 Canada-U.S. Great Lakes Water Quality Agreement required a Joint Contingency Plan for use in the event of a discharge of oil. The U.S. National Contingency Plan noted above is compatible with and complementary to the Joint U.S.-Canadian Plan.

Under the Toxic Substances Control Act of 1976 (TSCA) US EPA has been given broad authority to regulate chemical substances and mixtures if they are determined to present unreasonable risk of injury to health or/the environment. Regualtion by US EPA will be implemented through administrative rule-making. These regulations may involve prohibitions or limitations related to the manufacture, processing, distribution, commercial use or disposal of a specifically designated chemical or mixture. US EPA may also impose labeling or record-keeping requirements and require manufacturers to give notice of any unreasonable risk associated with their chemicals. Provisions of TSCA are now being implemented by US EPA.

As with the other nonpoint sources of pollution, designated areawide water quality management planning agencies are required to develop a process to identify pollution caused by industrial waste disposal activities as a part of the 208 program. As appropriate, implementation measures to control these sources are to be included in the 208 plan.

State

At the state level, in addition to those mechanisms discussed above, programs for licensing industrial waste haulers exist in several states and requirements that industries which handle specified critical materials file pollution incident prevention plans have been adopted in others. Regulations controlling deepwell waste disposal are required in Michigan and Ohio. In other states no specific deepwell disposal laws exist, but several policy statements have been issued. Injection well policy was established in New York in 1969 and in Illinois in 1970. Related legislation was formed in Indiana in 1969.

Where there are no specific statutes, deepwell disposal practices are regulated most frequently through statutes dealing with water pollution control, health, or oil and gas.

Sub-State

Direct local control of industrial waste disposal is minimal. Local ordinances define operating policies for local solid waste disposal facilities which often place limitations on the kinds of wastes a landfill can accept. Though these rules will serve to protect the environment from probable leaching of hazardous substances the rules can also provide an incentive for clandestine disposal by industries faced with no other alternative. Local land use authority is used through zoning regulations to limit storage and disposal, within certain zoning districts, of certain classes of waste that are particularly noxious or hazardous. These regulations are generally motivated by the desire to protect neighboring property owners from negative land use externalities rather than protection of water quality.

BASIN-WIDE TRENDS

Quantities of toxic industrial wastes requiring disposal are rapidly growing and are likely to increase in the future. Rising environmental standards and increasing awareness of long-term impacts of even low level concentrations of certain wastes is resulting in the closing off of many traditional disposal options, (landfills, seepage lagoons, deepwell injections). Despite this there has been no consistent regulation of these wastes from the point where they become wastes until the time they are either destroyed or safely disposed of. Prospectively, implementation of legislation noted above under United States, Federal may provide such a program in the U.S. portion of the Basin.

OBSERVATIONS

Ontario liquid industrial waste disposal policy and regulation appears self-contradictory. Provincial policy calls for both reducing disposal of toxic liquid industrial wastes in (1) deepwells and (2) surface landfill sites. However, in the face of currently insufficient industrial reclamation of liquid wastes and annually increasing quantities of such wastes, the two policies cannot be carried out simultaneously. Currently, there are no deepwell sites receiving such wastes. As a result, these wastes are going to landfill sites in great quantities as well as to even less environmentally suited areas.

A waybill system has recently been established by regulation under the EPA to tag waste haulers. Industry spokesmen have called this approach a first step toward better control of liquid industrial wastes, but find that there are "many loopholes in it and it doesn't mean very much unless its policed". (The problem of policing may also be posed in controlling waste oils meant for application to rural roads. Such oils can frequently contain excess PCB levels as is evidenced by recent MOE interim guidelines which state maximum PCB concentrations. Approximately 6.5 million gallons of oil are spread annually on about 2,000 miles of unpaved roads in Ontario).

The problem of policing also has transboundary implications. A recent Environmental Protection Service, Fisheries and Environment Canada investigation revealed that substantial quantities of hazardous wastes, including PCB contaminated material, have been transported across the Canada-U.S. border in both directions for disposal. Frequently, no information has been available respecting the toxicity or chemical composition of such wastes. Reasons for this transboundary movement of wastes are believed to include (1) it may be cheaper to dispose of wastes at sites that are geographically closer though in the other country and (2) it may be easier to dispose of wastes in a jurisdiction where regulation is less stringent.

As noted above there is a likelihood that many municipal disposal facilities will be unacceptable for disposal of certain wastes. Additionally, regardless of environmental factors some communities may refuse to accept particularly hazardous substances. Moreover, it is indeed possible that no site exists within a given state/province for disposal of some wastes in an environmentally sound manner. State/provincial provision of adequate facilities for wastes which cannot be safely received locally is a logical means of reducing import/export conflicts. Availability of such a facility could also reduce the enforcement burden on agencies which must assure the exclusion of certain wastes from sanitary landfills.

Another issue is waste reclamation. As an analogue to resource recovery the reclamation of industrial wastes is a potential means of reducing the quantity of waste requiring disposal. The waste exchange operated in St. Louis, Missouri and under study in several other areas is one model for this approach.

TRANSPORTATION CORRIDORS

CONSTRUCTION AND MAINTENANCE ACTIVITIES

OVERVIEW

Management of construction and maintenance activities associated with transportation corridors (roads, highways, railroads, airports, pipelines and utility transmission lines/hydro rights-of-way) is largely the function of special purpose agencies. Control of pollution from these activities has not generally been subject to close public scrutiny. Internal agency controls comprise the primary mechanism by which diffuse source pollution is managed. In Ontario there has been some recent movement from agency self-regulation to external environmental review and approval in selected areas.

CANADA

Federal

Where pipelines, railways, airports and related facilities are interprovincial in nature or designated as being for the general advantage

of Canada they are arguably under exclusive federal jurisdiction pursuant to the constitution and relevant case law interpretation.

Control of water pollution from the construction, operation and maintenance of such facilities is not normally undertaken through federal environmental legislation such as the Fisheries Act. Where water pollution control has been attempted, it has usually been initiated through legislation that was enacted to facilitate such development projects or else through non-statutory in-house administrative procedures and guidelines.

Under the Fisheries Act, the federal Environment Minister's capacity to require plans and specifications from the proponent of an activity is not, and is evidently not intended to be, used systematically as though it were a permit system. It is rarely invoked for projects in Ontario which are otherwise under federal jurisdiction. This may in part be due to the fact that a Ministerial order under the Act would have to relate to the protection of fish or fish habitat, not to water quality per se. In practice there may well be few instances where this limitation would prevent the Act from being effective to protect water quality.

The federal government has developed a non-statutory program known as the Environmental Assessment and Review Process (EARP). The EARP developed as part of a federal cabinet directive to control pollution from existing federal facilities and to prevent pollution from proposed federal works. It is intended to apply to projects that are initiated by federal departments and agencies, for which federal funds are to be made available, and where federal property or Crown lands will be used. Federal proprietary crown corporations (i.e. those in competition with private enterprise) and regulatory agencies (e.g. National Energy Board responsible for pipelines) are invited, though not required, to participate.

The EARP is mainly directed to large scale projects. For smaller projects internal procedures for each department have evolved without further reference to EARP.

Ontario

Prior to the enactment of the Environmental Assessment Act, plans for drainage works under legislation administered by the Ministry of Transportation and Communication (MTC) did not have to be submitted to the MOE for approval.

MTC and Ontario Hydro, the province's principal utility, currently have voluntary programs respecting erosion and sedimentation from such activities. Sediment control techniques are (and were prior to the EAA) incorporated into contract specifications. MTC has also sponsored studies into the effectiveness of its sediment control measures on specific construction projects.

Major new provincial highway and transmission line projects will, in future, require environmental impact assessments, hearings and approvals before start-up under the recently enacted EAA. Because the Act is in a

transition phase, large projects deemed by the province to be in an advanced state of planning and development (i.e. in this position prior to the Act's coming into force) will generally be exempt from the Act.

Smaller road construction and upgrading projects will not likely require individual environmental assessments. These projects will generally be reviewed by class (i.e. non-site specific) assessments subject to MOE overview. Most exemptions for environmental assessments for hydro transmission line development will, with some exceptions, require Ontario Hydro, to carry out any construction and maintenance in accordance with MOE approved construction and site restoration guidelines.

The application of the EAA to regional and local government road departments is still being determined in negotiations between municipalities and the province.

The MTC annually subsidizes municipal road construction with approximately $300 million.

Trend

No changes in the current situation at the federal level appear likely. It would appear that class environmental assessments will be used as much as possible with respect to both provincial and municipal road undertakings of a non-major character. It would further appear, at least at the provincial level, that the proportion of major new highways relative to general upgrading projects will be declining in the future.

UNITED STATES

Federal

The Federal Highway Administration (FHwA) and the Federal Aviation Administration (FAA) both require erosion control standards be followed in all construction or improvement work for airports or highways where federal funds are used. The National Environmental Policy Act requires an overall environmental review of all federal or federally-funded projects with the requirement that an environmental impact statement be prepared on projects that may have significant environmental impact. The Act has provided an important mechanism for addressing environmental effects of proposed projects but it is better suited to project planning issues than to control of erosion and sedimentation once construction is underway.

State

Highway departments in each state have responsibility for administration of the erosion and sedimentation control procedures required under the FHwA program.

In Pennsylvania and Michigan erosion and sedimentation control programs apply to state or local public works agencies or public utilities for earth change activity which they may undertake irrespective of the nature of the project (highway, railroad , airport, pipeline) or the source of funding.

Trend

No changes in present institutional arrangements appear to be likely in the foreseeable future. Continued agency self-review coupled with sporadic citizen or agency review through right of action statutes (such as exist in Michigan and Minnesota) and through the environmental impact review process (such as is available through NEPA and in New York) appear likely for public projects.

OBSERVATIONS

Two interrelated issues appear to emerge with respect to existing federal initiatives in this area. First, there are serious handicaps in using non-statutory administrative procedures as substitutes for preventive statutory environmental controls. Second, environmental protection may frequently suffer because environmental control responsibility and authority are fragmented between agencies.

Non-statutory procedures, such as EARP, in Canada while of precedental value, do face some serious obstacles. Such procedures depend upon the cooperation of the particular department or agency concerned, and they must compete for attention and funds with the agency's prime legislative mandate which of course usually has nothing to do with pollution control. Each department or agency under its legislative discretion and decision making authority, is also the final arbiter of which environmental constraints it will adopt. As such it is submitted that federal environmental policy as conceived in the EARP cannot be uniformly applied, since it is subject to varying interpretations and degrees of adoption by each department or agency.

Fragmented authority also presents problems. For example, in Canada under the National Energy Board Act, the National Energy Board (NEB) and not the Environmental Protection Service of Environment Canada, has the authority to decide what environmental measures must be carried out by companies during pipeline construction. While the NEB is knowledgeable with respect to environmental matters, environmental agencies have recorded subsequent in-the-field departures from NEB approved environmental requirements, which resulted in water quality problems.

There are also a number of issues that arise at the provincial and local level. It is not clear, for example, whether environmental assessment law is an adequate and enforceable substitute for a statute directed to control of sedimentation from many smaller land-disturbing activities where individual site specific environmental assessments have not been performed (See Page 98).

There may also be difficulties with the comprehensive and systematic effectiveness of sediment controls employed through public agency proprietary/management or self-regulation initiatives. For example, while the MTC program is of precedental and experiential value, there may be wide fluctuations from

project to project, in the types of controls which are applied and in their effectiveness due to economic and other factors. Moreover, even when the control measures required by the contract between MTC and the construction contractor are adequate, field enforcement of its provisions may present a problem. This difficulty arises from the fact that the relationship developed by this type of program is contractual, not regulatory. If environmental provisions are violated by the construction contractor, effective enforcement options, such as stop or control orders, are not possible under a contractual relationship as they would be under a regulatory one. Moreover, as the owner of the facility being built, the MTC is unlikely to resort to such enforcement techniques in any case.

Similar problems may arise in Ontario at the regional government level as well. For example, regional road department construction techniques generally emphasize protection of streams during watercourse crossings and post-construction revegetation measures. However, regional road department contract specification, with some exceptions, do not contain specific provisions requiring sediment control especially with respect to the use of interim or temporary soil stabilization techniques during construction unrelated to stream crossings. Some regional road departments do not regard the lack of interim and temporary soil stabilization as a problem, because most of their road construction contracts are completed within a fiscal year.

Other regional road departments acknowledge that interim and temporary soil stabilization techniques are proven, but too expensive to use on a systematic basis. In contrast, officials at the Michigan Department of State Highways and Transportation, where a program of soil erosion and sedimentation control has been underway for several years, indicate that additional costs due to use of sediment controls have not been significant and in fact use of preventive erosion control practices have saved the department money in some instances.

Some Conservation Authorities indicate that where Authority regulations are not in place, municipalities, although incorporating erosion control measures in their road construction projects, rarely incorporate siltation or sedimentation control measures.

If assurance of agency self-regulation is deemed to be needed, state/provincial actions should include clear standards for program performance and a requirement that the agency be held accountable for its conduct of such a pollution control program. The concept of the "authorized public agency" as used in the Michigan soil erosion and sedimentation control program serves as an instructive model in this respect.

In Canada constitutional constraints may also serve to limit environmental controls. For example, Conservation Authority regulations may be of no legal effect in relation to several transportation corridor activities that are arguably under exclusive federal jurisdiction. Authority dump and fill regulations have been held by the courts to be inapplicable to the activities of an interprovincial railway.

Provincial funding and subsidy mechanisms have not generally been utilized to steer recipients (e.g. municipalities) toward environmentally sound land management practices. In the case of MTC's annual $300 million subsidization of municipal road construction and up-grading programs, fiscal influence could have a substantial impact on current practices. However, MTC does not require as a condition precedent to a municipality receiving a grant, that the municipality undertake to ensure that appropriate sediment control measures are used in all such provincially assisted activity. MTC has not environmentally audited municipalities to determine which, if any, of those receiving provincial road building funds are undertaking such environmental measures on their own. The Environmental Assessment Act will not have much practical influence on MTC financial assistance programs because loans, grants and related fiscal techniques have been exempted by regulation from the provisions of the Act. The Ontario government prefers to apply the Act to those parties who are carrying out the undertaking rather than to those who are funding the activity.

ROAD DE-ICING PRACTICES AND SALT STORAGE

OVERVIEW

Road salt application practices throughout the basin have traditionally responded primarily to highway safety needs. In recent years there has been increasing public concern over the adverse environmental effects of road salts. These contrasting public views have contributed to a lack of legislative action. Institutional mechanisms which determine road salt application practices are internal to the agencies directly responsible for highway and street maintenance.

CANADA

Federal

A 1972 federal cabinet directive on pollution abatement authorized establishment of a controlled allotment fund for use in studying and remedying problems at federal facilities. Studies of airports owned and operated by the federal government have shown that the application of urea for runway de-icing results in contamination of stormwater. Collection, storage and treatment of contaminated runoff have been recommended. It is likely that implementation of such control measures will not be authorized by federal law but by in-house administrative procedure.

Ontario

Highway de-icing agents are defined under the Environmental Protection Act (EPA) as contaminants, but exempt from the provisions of the Act and regulations. Provincial environmental guidelines have been promulgated for de-icing compounds

and snow disposal, but they are of no legal effect. The provincial Ministry of Transportation and Communication (MTC) also has a program directed to minimizing the use of pure salt and salt in mixture with sand in snow and ice control. It is also involved in a number of demonstration projects in an attempt to find more effective procedures to reduce salt use consistent with current winter road maintenance levels.

MTC and most large municipalities have programs for protection of their salt/sand storage areas. This is more the exception than the rule for smaller, rural municipalities. Inadequately protected storage areas have been found to have potential for contamination of groundwater supplies.

The province banned the dumping of snow into lakes and watercourses in 1972, except in emergencies. The province prefers land disposal of snow, though some large municipalities may soon run out of land sites within their boundaries.

UNITED STATES

Federal

EPA has prepared manuals for use by local agencies on application practices, storage and handling techniques with respect to control of water quality degradation from highway de-icing activities.

State and Sub-state

Most state highway departments have issued Guidelines on the use of de-icing salts on their state highway systems. These are followed by state highway department crews and by county or local road or street departments who have maintenance agreements with the state agency. Typically, these guidelines detail the road and weather conditions that require different snow and ice removal strategies. Part of these strategies address the types and amounts of chemicals to be used for different snow conditions.

Specific programs at the state or local level to reduce water quality impacts of road de-icing have not been established.

BASIN-WIDE TRENDS

In both countries selective adjustments in application practices and storage techniques will be made as local problem situations are identified. It is difficult to evaluate whether constraints on road maintenance budgets would minimize flagrant over-application of road salts. These same budget limitations however could slow conversion by road maintenance agencies to more effective application equipment as such equipment becomes available. Further, the phasing out of inadequate or uncovered salt storage areas might also be slow if severe budget limitations predominate. Where research results indicate that adjustment in salt use is possible, closer adherance to existing guidelines may be advocated.

OBSERVATIONS

In both the U.S. and Canada, despite increasing public criticism of road authorities because of the adverse environmental effects associated with road

salting for snow and ice control, the same public has come to expect present levels of winter road maintenance. This paradox is, for example, reflected in the current status of road de-icing agents under Ontario law. That is, they are defined as contaminants under the EPA but, they are exempt from its provisions.

The state/provincial environmental agencies, apart from the development of non-statutory guidelines, are not in a position to do much about road authority road salting and storage practices. While these agencies (in conjunction with state/provincial highway agencies) respond to public complaints respecting groundwater or well contamination incidents, their efforts are restricted to attempting and facilitating cooperative or voluntary abatement solutions.

It is difficult to evaluate what influence the guidelines themselves have had on local practices. For example, in Ontario, the guidelines recommend that snow disposal sites be brought to the attention of the MOE regional offices for evaluation prior to seasonal use. However, one regional office noted that there are approximately eighty (80) land disposal sites for snow utilized by municipalities in the region though none of the sites are brought to the attention of MOE before use.

Indeed, because of the lack of regulatory control in this area, environmental agencies may not be in a position to know the degree of adherance to guideline precepts. In Ontario MTC and MOE indicate that some municipalities apply road de-icing salts at rates two to three times as great as the provincial guidelines recommend. However, sixty (60) percent of MOE regional offices responding to a survey did not know whether municipalities, in their region, were adhering to the guideline recommendations respecting de-icing application rates.

One approach that has not been considered by MTC is the pre-conditioning of its annual funding to municipalities on assurance and demonstration that proper road de-icing methodology is being employed and that salt and sand/salt storage piles are adequately covered.

SHORELINE LANDFILLING ACTIVITIES

OVERVIEW

Actions involving physical alterations of shorelands and nearshore bottom lands are influenced by a variety of government programs though water quality concerns are not always the subject of these programs. There are two significant public roles in this area. On the one hand, regulatory programs to control shoreline dredging and filling as well as other hydrologic alterations carried out by private parties are administered at both the federal and state levels in the U.S. In Canada, Conservation Authorities also carry out a similar function. Of at least equal importance are the operations of the public agencies which themselves engage in dredging and landfilling activities. The role of public agencies in controlling private sector actions as well as action by public agencies with respect to dredge and fill activity has drawn considerable public attention. Debate of these issues has basically reflected a larger controversy which pits concern for protection of wetland habitat against development pressures and antagonism toward government regulations.

CANADA

Federal

Federal authority to regulate foreshore landfill and dredging operations is derived from British North America Act provisions respecting navigation and shipping, and the transference from provincial to federal control of public harbours, dredges and related matters at the time of confederation. In addition, federal responsibility for the protection of fisheries authorizes federal involvement in certain activities that affect fish and waters frequented by fish.

Generally, no permits or approvals are required under federal environmental legislation before dredge and fill activities take place.

Recent amendments to the Fisheries Act make it the best federal instrument for controlling water pollution from shoreline landfills and dredging. These amendments broaden the definition of fish habitat, and enable the Minister to require plans and specifications for existing and proposed activities and to reject a proposal or order that it be modified with the approval of Cabinet.

A Ministerial order under the Fisheries Act would have to relate to the protection of fish or fish habitat not to water quality per se; though in practice there may well be few instances where this limitation would prevent the Act from being used to protect water quality.

The EARP, which has been described earlier, may be applied where major federal dredge and fill projects are contemplated. Recommendations arising from environmental reviews of dredge and fill proposals conducted by the Environmental Protection Service, Environment Canada are normally incorporated into contracts between the federal Department of Public Works (DPW) and dredging companies.

Under the Navigable Waters Protection Act, no dumping fill or excavation materials may be placed in navigable waters unless the work, the site and the plans have been approved by the Minister of Transport (MOT). Such activities that in the Minister's opinion do not substantially interfere with navigation, do not require this approval. This is also known as a fill permit exemption. The Minister may also issue an exemption with conditions. The purpose of this Act is protection of navigation, not water pollution control.

Harbour Commissions which have the authority to regulate and control the use and development of land and property within harbour limits for purposes related to navigation and shipping and related matters, may enact by-laws respecting dump and fill activities that cause nuisances or damage or endanger property or persons. Environmental protection is not a purpose of Harbour Commission legislation per se.

Under the 1972 Canada-U.S. Agreement on Great Lakes Water Quality, dredging was also the subject of a special International Working Group review to identify current practices, programs and institutional mechanisms for its control. The Working Group's terms of reference required it to conduct its study and formulate its recommendations on the basis of the following principles: (1) dredging activities should be conducted in a manner that will minimize harmful environmental effects; (2) all reasonable and practicable measures shall be taken to ensure that dredging activities do not cause a degradation of water quality and bottom sediments; and (3) as soon as practicable, the disposal of polluted dredged spoil in open water should be carried out in a manner consistent with the achievement of the water quality objectives, and should be phased out.

The recommendations of the Working Group's 1975 report included that dredging projects be examined on a site-specific, case-by-case basis.

Ontario

No permits or approvals are required under the EPA if clean or inert fill is dumped. The EPA (Part V) has not generally been used to require permits or approvals where on-land disposal of contaminated dredged spoils is contemplated. Neither the EPA, nor any other special or general Act explicitly covers control of dredging. The Environmental Assessment Act may in future require approvals of such activities including either class or individual environmental assessments.

Under the Public Lands Act, administered by the Ministry of Natural Resources (MNR), it is an offence to throw or deposit any material or substance upon public lands, whether or not covered with water or ice, without Ministerial consent.

Conservation Authorities are authorized by their enabling legislation to control through permits the placing or dumping of fill in a mapped floodplain or scheduled area attached to their regulations. Some Conservation Authorities along the Lakes undertake recreational landfilling projects themselves.

Municipal and regional governments may also include policies in their official plans for protecting water quality including marshes, swamps, bogs, water recharge/headwater areas and environmentally sensitive areas.

Trend

At the federal level, it would appear that dredge and fill activities will continue to be dealt with on a case-by-case basis under existing non-statutory administrative arrangements. At the provincial level, more systematic control of such activities may be anticipated under the Environmental Assessment Act. Whether, class and/or site specific environmental impact assessments will be required is not yet clear. Moreover, the extent of provincial preventive control may be constrained by constitutional limitations, where federal heads of power arguably exclude application of provincial law.

Special purpose federal/provincial committees have proposed temporary prohibitions on further dredging and filling in certain wetland areas, such as those along the 425 mile-long Rideau-Trent-Severn system (known as CORTS), until studies have been completed identifying and ranking the importance of such areas.

UNITED STATES

Federal

The COE has a long history of involvement in regulation of activities in navigable waters. Traditionally the COE's primary interest in such regulation had been the protection of the navagability of waterways and harbors for defense purposes and as a means of promoting commerce. During the last ten years as the nation's concern for the conservation and protection of environmental resources grew, the values which the COE has been asked to consider in administering its regulatory program have been broadened considerably to include a number of public interests. At present under Sections 9 and 10 of the Rivers and Harbors Act of 1899 and Section 404, permits are required from the COE for activities involving construction in navigable waters (e.g. piers, dams, bridges) and for disposal of dredged and fill material. The COE's disposal program for polluted dredge spoils requires that material dredged from channels and harbors be disposed of on land or in diked containment areas if the spoils exceed specified pollution criteria.

The major U.S. program associated with the control of shoreland landfilling and dredging concerned with water quality impacts is the permit program created by Section 404 of the Federal Water Pollution Control Act Amendments of 1972. The 404 program is intended to regulate the discharge and disposal of dredged or fill material in the "waters of the United States". Responsibility for the program is shared. The U.S. Army Corps of Engineers (COE) is responsible for program administration including permit issuance and enforcement. The US EPA is responsible for program oversight and policy development. Significantly this includes authority to publish guidelines (required under 404(b)) and the power to veto issuance of any COE permit where environmental factors are not adequately considered (under 404(c)). The provision of a significant role for US EPA in the 404 program underscores Congressional interest in the environmental protection aspects of the Section 404.

1977 Amendments to PL 92-500 have considerably changed Section 404. Notably, under the new provisions (Section 404(g)) states are authorized to administer permit programs for waters not traditionally regarded as navigable waters. The programs are to be carried out under state laws in lieu of the Section 404 program, provided the state programs are approved by US EPA. The amendments also provide for issuance of "general permits" (Section 404(e)) for certain actions which are deemed by the Secretary of the Army to (a) be similar in nature (b), have only minimal adverse environmental effect and (c) have minimal cumulative effect. COE has actually been issuing general permits for two years under its rule-making authority. Additionally, the amendments (Section 404(r) exempt certain federal projects from regulation in recognition of a constitutional principle of separation of powers. That is, federal projects specifically authorized by Congress are not subject to regulation, except for toxic and

pretreatment effluent standards provided by Section 307, if information on the effects of such discharge is included in an environmental impact statement completed before appropriation of funds for construction.

Other federal programs relevant to alterations in the shore zone are the coastal zone management program (discussed under Lakeshore Erosion) and the water quality management planning program (discussed elsewhere) both of which provide incentives to states and local governments to conduct planning and implementation programs which address shorezone issues.

States

The control of shoreland dredging and filling varies from state to state but all states have permit programs parallel to the COE permit program under Section 404. Three states (Michigan, Minnesota and Wisconsin) have state shoreland zoning and management statutes (discussed under Lakeshore Erosion) which set standards and procedures for local land use controls in shoreland areas.

New York has a statute designed to protect designated wetlands and Pennsylvania has a comprehensive permit program applicable to any of several actions contemplated in any shore zone.

Trend

Significant change in management of this area is not likely. 1977 Amendments to the Water Pollution Control Act primarily serve to grant statutory approval for many practices that were previously authorized under COE regulations. Elimination of duplicative requirements for state and federal permits will likely occur since states may now, upon federal approval, conduct programs under Section 404(g) for the waters not covered by the COE.

OBSERVATIONS

Authority to control pollution from shoreland alterations exists in both Canada and the U.S. In Canada the authority is broad while in the U.S., permit programs specifically address water quality. The framework for control of pollution in this area has weaknesses which call attention to the more general issue of (1) the effectiveness of non-statutory administrative arrangements and (2) constitutional limitations of state/provincial law. Where the validity of state/provincial jurisdiction is in doubt, then preventive federal environmental legislation may be necessary in conjunction with or as supplement to state/provincial laws. In the absence of such federal action, then state/provincial controls by themselves may be insufficient.

Federal statutes such as the Navigable Waters Protection Act are not pollution control statutes. In the case of the NWPA (whose sole purpose is navigation) exemptions for NWPA permit requirements for the dumping of fill cannot be denied if the application has negative environmental implications, but would not infringe on navigation. According to an EPS/Canadian Wildlife Service report on wetland destruction, a standard form MOT response

to environmental agency requests to deny an NWPA application reads "cannot deny exemption on grounds of interference to navigation, we note your environmental concerns and suggest you invoke environmental regulations outside the Act". Ironically, environmental agencies frequently turn to the NWPA because there is not adequate preventive federal environmental legislation to invoke. It is submitted that an Act such as NWPA, which provides an opportunity to review projects and express concerns but which is not specifically related to pollution problems is not adequate for environmental protection.

In the U.S. prior to passage of PL 92-500 environmental protection under the 1899 Rivers and Harbors Act by the COE (an agency with a strong pro-development bias) was an essentially parallel situation. The controversial history of the 404 program as pro-environmental legislation suggests that even with a mandate for an environmentally oriented regulatory program, assurance of environmental protection is slow to be realized.

Non-statutory programs established by Cabinet directive in Canada such as the Environmental Assessment and Review Process (meant to apply to federally owned, assisted or operated activities) may also be seriously handicapped in acting as substitutes for preventive regulatory controls:

(1) There are questions as to which federal bodies the process applies (e.g. harbour commissions appear unaffected by the process);

(2) EARP can be limited by conflicts with other cabinet directives (e.g. on harbour development);

(3) EARP can be limited by federal legislation that is silent on environmental matters;

(4) EARP has concentrated on large development proposals as opposed to the many smaller ones.

The cumulative effects of these limitations can serve to make EARP neither a comprehensive nor a preventive planning/pollution control strategy.

As already noted, recommendations arising from Fisheries and Environment Canada (EPS) reviews conducted under administrative arrangements are, incorporated into contracts between the Department of Public Works (DPW) and the dredging companies. However, limitations on staff and resources make it difficult for EPS to know if its recommendations are being followed, or, if they are being followed, whether they are producing the desired results. The result is that frequently EPS cannot refine and improve upon its recommendations to DPW in future dredging proposals. Moreover, this difficulty may also result in the inability to enforce Fisheries Act pollution prohibitions, since insufficient on-site review may result in insufficient evidence to prosecute a case.

No permits or approvals are required under the EPA if clean or inert fill is dumped. Reactive control of clean fill dumping under the EPA has been constrained by judicial determinations that have strictly construed

such options in relation to the use of private property. Maximum penalties for unauthorized filling under the Public Lands Act are nominal.

Generally no environmental permits for dredging have been required under provincial law. This would appear to be the case because of perceived or actual constitutional constraints. Without preventive environmental restrictions under federal law, provincial control may be less thorough or in doubt altogether where navigation or shipping matters (federal heads of power) may be affected. It is arguable under such circumstances whether the Ministry of Environment could use Part V of the EPA in a preventive manner (i.e. permit issuance) where on-land disposal of contaminated dredged spoils was contemplated.

The recently amended Fisheries Act while giving Fisheries and Environment Canada greater authority to protect fish frequented waters and fish habitat still suffers from serious preventive control flaws. These preventive control gaps and inadequacies are of concern especially where comprehensive provincial legislative authority may be in doubt because of constitutional and jurisdictional constraints. For example, the Act does not set up a permit system and DFE's use of the Act's other preventive control options is rare. It is not generally invoked in Ontario prior to fill activities associated with navigation, shipping or certain harbours (areas arguably under exclusive federal jurisdiction).

Conservation Authorities can control by permit the dumping of fill in a mapped floodplain or area scheduled under their regulations. However, constitutional constraints appear to limit the effectiveness of Authority regulations. For example, Conservation Authority dump and fill regulations have been held by the courts to be inapplicable to the activities of an interprovincial railway.

It is further regarded as doubtful whether Conservation Authorities could apply their regulation to federal land. Authorities have been unable to control the dump and fill activities of some harbour commissions within their harbour jurisdiction in the past.

Regional government official plan policies of protecting water quality and wetlands may conflict with federal ownership and plans for the commercial or industrial development of such lands. The result may be regional environmental policies not being realized. In one instance, representations by a harbour commission to a regional government contributed to changing the intended designation of federal land from an environmentally sensitive category to an industrial use category.

A related problem which has broader application than just shoreline landfilling (e.g. the problem also applies to drainage, transportation corridors, solid waste disposal and construction site runoff where public projects are involved) is that of assuring agencies of government carry out their own construction or development projects in a manner compatible with environmental quality objectives. In many instances though required to follow substantive provisions of environmental protection statutes, agencies have been exempt from procedural requirements. As noted above in the section

on SOLID WASTE DISPOSAL (page 40) the states have argued successfully that federal facilities should meet both the procedural and the substantive requirements for complying with environmental protection regulations. The essence of the state argument is that without the submission of appropriate permit applications and specified reports it would be impossible for the states to evaluate whether the regulated activity was in compliance with substantive aspects of the regulations.

Even when procedural requirements are being met it appears that within the same level of government there is a reluctance or inability to enforce provisions of established regulatory programs. For example, an article in The New York Times of September 19, 1977, reported that "it was understood" that federal agencies including US EPA did not sue other federal agencies. The article was headlined "Federal Violations of Water Act Cited; US EPA has not Penalized Hundreds of U.S. Agencies for Pollution". Although follow-up to that news story included letters from US EPA to the involved agencies indicating legal action may be taken if corrections were not made, no suits had been filed by early 1978. Similarly, in Canada a 1975 harbour commission dump and fill incident was the subject of questions in the House of Commons in May 1976, including one as to whether the federal Department of Environment intended to take action against the Ministry of Transport if any infractions of federal laws were indicated. As of November, 1976, the response of the Federal Minister of Environment was that federal departments do not take legal action against one another.

In the U.S., evidence can be found even within the same statute of inconsistencies with respect to requirements for control of public agency activity. Section 61 of the 1977 Clean Water Act, on the one hand clarifies that federal facilities must comply with both substantive and procedural requirements of US EPA and the states respecting the NPDES. On the other hand Section 67(b) adds a new subsection (r) to Section 404 which applies to projects specifically authorized by Congress (this would include many COE dredging and water development projects). Under Section 404(r), the discharge of dredged or fill material as a part of such projects is exempt from regulation under Section 404 provided an environmental impact statement which adequately discusses the effects of such discharge [including consideration of US EPA guidelines developed under Section 404(b)(1)] has been filed with Congress prior to the discharge. That Congress should reserve environmental oversight of this COE activity through an environmental impact statement mechanism while in the same Act specifically indicating that other federal agencies must meet state and local procedural and substantive requirements for pollution control suggests two very different philosophies of environmental regulation. The depth and quality of the discussions in the EIS of the effects of the discharges and the adequacy of the consideration of the 404(b)(1) guidelines will be crucial to the success of Section 404(r). Whether Congress with its many other duties and interests will be able to provide the necessary scrutiny to assure adequate consideration may be questionable.

Similarly in Canada, some Conservation Authorities along the Great Lakes are undertaking landfilling projects of their own for recreational develop-

ment purposes, but do not subject themselves to their own permit requirements under their regulations. Some of these projects can have adverse local water quality impacts. Field review experience of senior environmental agencies indicates that some Conservation Authorities have not always exercised the best management and construction control in limiting water quality contamination by these projects. The Environmental Assessment Act, to the extent it requires individual environmental assessments may improve this situation in future.

The authorization for general permits under 404(e) as provided for by the 1977 amendments to PL 92-500 appears to be intended to streamline COE administrative procedures. However, in implementation this may result in compromise of environmental quality. A recent U.S. General Accounting Office report (Dec. 23, 1977, Improvements needed in the Corps of Engineer's Regulatory Program for Protecting the Nation's Waters, CED-78-17) for example, noted that policies from one district to another were not consistent respecting use of general permits and that additional guidance from COE headquarters was needed to assure adequate evaluation of general permit applications. Moreover, if policing of individually permitted discharges has been subject to difficulties the policing of activities covered under general permits appears to be more troublesome.

A recent internal EPA report noted that implementation of the general permit program appeared to be more intended as a means of legalizing minor activities which technically required permits rather than assuring pollution abatement from such activities. The report also noted that permit conditions seemed to be drafted in general terms so as to avoid violations. The general permit concept is essentially parallel to the class environmental assessment and would appear to be subject to similar limitations. See the discussion of class environmental assessments on page 98.

EXTRACTIVE OPERATIONS

OVERVIEW

Institutional arrangements relevant to control of pollution from extractive operations address three major activities - operation of pits and quarries; mining activities; and disposal of brines from oil and gas operations. Control of these activities has generally been a state/provincial function. Environmental, and more specifically water quality, issues while not the exclusive focus of these controls are considered in review of permit applications.

CANADA

Federal

There is no federal permit or approval control respecting extractive operations except for licences that are required under the Atomic Energy Control Act for uranium and thorium mining operations. Recent Fisheries Act regulations respecting metal mining liquid effluents have been promulgated.

These regulations are intended to protect fish and other aquatic life from the discharge of deleterious substances from new, expanded and re-opened base metal, uranium and iron ore mines.

A number of guidelines and codes of good practice have been developed by Environment Canada (EPS) for new, expanded and re-opened metal mines as well as for existing mining operations. However, they are of no legal effect.

The Atomic Energy Control Board (AECB) has also developed guidelines to be used in conjunction with its licensing of uranium and thorium mine-mill facilities. The AECB also established a Mine Safety Advisory Committee to advise it on a wide range of matters respecting mining operations including inspection, monitoring, effluent control, and tailings management.

Ontario

Mining operators must obtain MOE approval prior to start-up for mining discharges, drainage and waste works under the Ontario Water Resources Act. Rock fill and mill tailings from mines are exempt from the waste management part of the Envrionmental Protection Act and regulations. Legislative authority for requiring and ensuring that tailings areas are stabilized resides with the Ministry of Natural Resources (MNR) pursuant to the Mining Act. The Mining Act also authorizes the MNR to require a bond or security deposit in an amount necessary to complete rehabilitation.

The Mining and Lands Commissioner pursuant to the Mining Act has powers which include authorizing or granting easements to a mine operator to deposit tailings, slimes or other waste products upon any land or water if the effects are not injurious to life or health.

Pit and quarry operations in designated parts of Ontario must be licensed by MNR under the Pits and Quarries Control Act. The Act also authorizes periodic review, rehabilitation and security deposit requirements. Any person entitled to object to establishment of a pit or quarry may require a hearing which is conducted by the Ontario Municipal Board. Recent case law interpretation of certain provisions of the Act suggests that if a municipality has an official plan and it purports to prevent the operation of a pit and quarry at a location desired by an applicant, MNR is prohibited from issuing a licence. But where the official plan does not make clear that it prohibits the operation of pits and quarries in any particular part of the municipality, and the municipality only has a by-law that prohibits the establishment of such operations, MNR is only prevented from issuing a licence to new operations, not pre-existing ones.

Municipalities derive their powers to prohibit or regulate pit and quarry activities from provincial enabling legislation (i.e. The Planning Act and The Municipal Act).

Brines requiring disposal from oil and gas operations are subject to approval and regulatory control by MNR under the Petroleum Resources Act

to ensure that fresh water horizons or bodies of water are not contaminated. Oil field brines, though designated as wastes under the EPA, are exempt from MOE regulatory control.

Trend

In the foreseeable future it would appear that control of resource and extractive operations will, with some exceptions, remain fragmented between several agencies and levels of government. Typical of this trend are the recent recommendations of a provincial committee established to review government regulation of pit and quarry operations and propose legislative changes. The committee (known as the Ontario Mineral Aggregate Working Party) recommended that pits and quarries be exempt from the provisions of the Environmental Assessment Act and subject to a new mineral aggregate management statute administered by MNR. Aspects of such operations would still be subject to the OWRA, but rehabilitation matters would remain concentrated with the MNR. Similar splits in authority will continue for other mining and resource activities as well.

UNITED STATES

Federal

The major federal legislation which addresses pollution from extractive operations on non-federal lands is the Federal Water Pollution Control Act Amendments of 1972. The NPDES established by Section 402 of that Act requires a permit for any point source discharge from an extractive operation. Nonpoint source discharges from these operations are to be addressed by designated agencies conducting areawide water quality management planning under Section 208 of the Act. Specifically the plans must include a process to identify, if appropriate, mineral sources of pollution and they must set forth methods to control such sources to the extent feasible.

Other federal laws dealing with control of pollution from extractive operations are generally concerned with mining activities on federal lands (not an extensive practice in the Basin). For example, the Federal Coal Leasing Amendments Act of 1975 requires that a comprehensive land use plan be prepared for any national forest lands where mineral leasing is contemplated. Prior to issuing such a lease, environmental impacts of the proposed action must be considered, however, the federal government is specifically prohibited from denying a proposed lease solely on environmental grounds.

State

Michigan, Ohio, Indiana, New York and Pennsylvania have statutes that require a mine operator to obtain a permit or a license prior to establishing or operating a mine. Each state has established standards which operators must meet in order to keep their permits. Operators must post a performance bond to insure adequate reclamation and they must file a plan outlining procedures to be followed in conducting the operation.

The same states have legislation which is intended to control oil and gas operations in much the same manner as the programs to control mining operations noted above. Permits are required to drill, operate, or plug oil or gas wells. Additionally, in Ohio a program is underway to assure plugging of previously abandoned (orphaned) wells. The absence of controls in Minnesota and Wisconsin reflects a general lack of these kinds of extractive operations in the states.

Ohio, Wisconsin and Michigan have no controls on pit and quarry operations which specifically address water quality. New York, Pennsylvania and Minnesota consider pits and quarries as mining operations and control these operations through their mining statutes.

Trend

Existing arrangements for control of extractive operations will receive greater scrutiny as increased pressure for development of new energy supplies is translated into additional exploration and production in the Basin. Future regulation of oil and gas exploration in the open waters of the Great Lakes is likely to be controversial and complicated. However, the present interest in other nonpoint sources of pollution which are regarded as more serious than those resulting from extractive operations and the present low level of mining and drilling in the U.S. portion of the Basin make it unlikely that significant attention will be devoted to this area in the next several years.

OBSERVATIONS

Unlike many other land use activities examined by PLUARG, extractive operations are carried out in the context of considerable regulatory controls which can address the nonpoint source pollution which may result from such operations. The weak link in some of these programs appears to be attaining compliance with permits. Manpower levels for site inspections are low, thus making identification of violations and follow-through on enforcement action difficult.

In Canada, federal capacity to ensure water pollution control from new, expanded or reopened mining operations will increase with the passage of metal mining liquid effluent regulations under the Fisheries Act. Codes and guidelines, associated with the regulations but with no legal effect in and of themselves, will permit federal environmental agencies to negotiate with mine operators for incorporation of appropriate mine drainage and tailings disposal controls.

Prospective problems with the new provisions include the adequacy of federal enforcement staff, the length of time given to existing mine operators to comply, and the role of the public in the process.

Regulations are more quickly made applicable to new operations than to existing operations - though the latter are frequently the reason the regulations were developed in the first place. For example, often existing mining operations out-number prospective new, expanded or re-opened mines. The result is that the actual application of new regulations is initially quite narrow. To speed up the broader application of new regulations, compliance schedules are negotiated by the government and the individual mining operator, taking into account local diversity in both environmental conditions and mining operations. However, public consultation is not authorized in the development and approval of local timetables for compliance. These problems are exemplified in the recent base metal mining regulations promulgated by the EPS pursuant to the Fisheries Act.

The approval process for uranium and thorium mining operations that are under the jurisdiction of the Atomic Energy Control Board is currently being reviewed, to determine the extent of provincial authority to impose valid environmental, including water quality, constraints on these activities.

The Ministry of the Environment has the principal responsibility for controlling water pollution from mining, pits and quarries, and related activities. However, administrative control of other aspects of these operations is, generally, vested in the Ministry of Natural Resources; and there are some problems along the dividing line between the two Ministries - overlaps, gaps covered by neither of them, and areas where the MOE is responsible for the ends, but MNR controls the means.

For example, the MNR has the power to require security deposits to ensure that sites are rehabilitated; but it has either set the amounts of these deposits too low for them to be effective, or not demanded any deposit at all. Abandoned mines are regarded as the principal environmental problem in the mining industry. A provincial government program is being developed to deal with this problem though remedial measures on unowned mining property are expected to cost in the millions of dollars.

Another area of jurisdictional conflict (or ambiguity) is that of land and water easements granted to mining companies for the disposal of wastes. The MNR has the power to grant these easements, although the MOE is responsible for dealing with any water pollution that might ensue. An administrative solution is being worked out; but a legislative solution, requiring the MNR to condition the granting of easements on the fulfillment of MOE environmental requirements, would provide more certainty and consistency.

The MOE does have, and exercises, the power to order existing mining operations to meet environmental standards, and to negotiate timetables for compliance. However, negotiations are conducted with no public scrutiny, and very little information is available as to how much weight is given to technical and economic factors, as opposed to environmental ones.

Pits and quarries come under the Pits and Quarries Control Act; but there are large areas of the province where this Act is not in force. The Mining Act (for Crown lands) and municipal and local controls (for private lands) apply in these areas, but they are much less stringent and comprehensive.

Moreover, the Working Party on Aggregate Resource Management, a group created by the province to review government regulation of the sand and gravel industry, has found that even where the Pits and Quarries Control Act does apply, enforcement is inadequate, largely because the MNR does not have sufficient staff.

The Working Party has made recommendations which, if adopted, would severely restrict local control of the location and operation of pits and quarries, although area municipalities might still be able to attach conditions, including water pollution controls, to pit and quarry approvals.

Brines requiring disposal from oil and gas operations are subject to prior permit and regulatory control by the MNR under the Petroleum Resources Act to ensure that fresh water horizons or bodies of water are not contaminated. At the same time oil field brines, though designated as wastes under the EPA, are exempt from MOE regulatory control. This separation of authority is in contrast to related areas of mutual concern and regulation by the two ministries, such as deepwell disposal of liquid wastes and brines (other than oil field brines).

An issue that is not evident from a review of U.S. legislative arrangements particular to extractive operations in the Great Lakes Basin but which nonetheless may be of importance to state pollution control activities in the Basin involves the legality of state programs to control mining of coal where federal mineral rights are held. In much of the west when land ownership was transferred to private individuals under the various Homestead Acts the federal government reserved the subsurface mineral rights. Thus in many areas of the west although surface rights are privately held, mineral extraction may occur under federal regulations. Recent Department of Interior Regulations adopted pursuant to the Mineral Leasing Act of 1920 note that state rules and regulations for protection of environmental quality may apply to mining of coal under federal leases provided they are at least as stringent as federal regulations. However, the DOI regulations also provide that state rules and regulations would not be used if their effect would be to prevent the mining of coal in that state. Under these regulations, reclamation statutes in Montana and Wyoming have been applied to coal lease operations but without important provisions which require surface land owner consent prior to mining operations and which designate specified lands as unsuitable for mining.

The question of the extent to which federal regulations can preempt stricter state regulatory programs is currently being tested in the courts. Though applicability of this specific situation within the Great Lakes Basin states is minimal, the precedent that it could set may be of considerable interest to other programs contemplated within the Basin.

FORESTED AREAS

OVERVIEW

The question of major significance for control of pollution from forested areas is the extent to which regulatory mechanisms encourage land stewardship through use of management practices appropriate to water quality protection.

In the U.S. explicit controls on water quality are not mandated for forest practices on private lands. (In Ontario, there is minimal logging activity on private land). On public lands, forest practices are controlled through contract specifications and Crown timber licences administered by forest management agencies.

CANADA

Federal

The federal government has a very limited role in Ontario with respect to controlling water pollution from forested areas. However, a number of Fisheries Act provisions apply to such areas to the extent that fish may be adversely affected by forest management activities.

The Act makes it an offence for any person engaged in logging, lumbering and land clearing, or other operations to put any slash, stumps or other debris into any water frequented by fish, or in a place where it is likely to get into such water. The act does not establish a permit system in conjunction with this prohibition. Ministerial capacity to selectively require plans and specifications and order modifications of projects has been discussed elsewhere. This instrument has not been used in Ontario in this context.

It would also be open to the federal government or the appropriate Ontario agency to utilize Section 33(2) - the deleterious substance section - to prosecute for sedimentation from logging, lumbering and other land clearing operations.

The Pest Control Products Act has been discussed previously. Federal procedures respecting pesticide aerial spraying of woodlands and forest management areas have recently been strengthened to better supplement provincial permit and licence control.

Under the Canada/Ontario General Development Agreement program, DREE will be increasingly involved in financial assistance initiatives in support of the forest industry in northern and eastern Ontario. Future subsidiary agreements arising out of this program could include surveys; silvicultural labour accomodation camps, construction of forest access roads and a hybrid poplar program.

Ontario

Licences to cut Crown timber when tenders are called, or in a salvage operation, or in certain other circumstances are authorized under the Crown

Timber Act, administered by the Ministry of Natural Resources (MNR). Crown management units on public lands, or on other lands where trees are vested in the Province, may be designated, and MNR may enter into agreements with any person for the supply of Crown timber.

In conjunction with these provisions licensees must furnish to MNR for approval a forest management and/or operating plan showing the proposed operations and their conformance with authorized MNR manuals on good forest management practices.

Each year licensees must submit to MNR for approval a plan outlining prospective cutting operations before they're commenced. Annual cutting operations must conform to the approved annual plan.

MNR may enter into regeneration agreements with a licensee for the promotion and maintenance of the productivity of the licensed area.

The Act does not create a duty to protect water quality from forest management activities.

Other Acts deal with control of cutting on provincial park lands; the planting of nursery stock or stand improvement on private, local government or Conservation Authority lands; and the development of municipal tree cutting by-laws. Provincial grants to localities and agreements with land owners may be entered into by MNR for forestry purposes which are defined to include protection against floods and erosion.

Under the Pesticides Act, MOE requires the licensing of commercial businesses and applicators and special permits for aerial spraying and direct application to waters.

Trend

Prospectively, under the Environmental Assessment Act, forest management activities will be subject to MOE control through incorporation of environmental protection techniques (e.g. sediment control) into forest management plans and annual operating plans of licensees arising from individual and class environmental assessments. Policies to control the size of clear-cuts will also be increasingly considered.

UNITED STATES

Federal

The U.S. Forest Service (USFS) (of the USDA) is the major federal agency involved in determining the harvesting practices utilized on national forest lands. A number of federal statutes, the most recent of which is the National Forest Management Act of 1976, guide the USFS in administering timber harvesting in the national forests. Water quality concerns are reflected in these management procedures though numerous other interests (economic, recreational, wildlife) compete for priority.

The USFS is required by law to manage the lands under its jurisdiction within the principles of multiple use management to produce a sustained yield of products and services and other purposes. Further, the USFS is authorized and required by regulations to dispose of the timber resource according to timber management plans. These plans must provide for the harvest of national forest timber based on the Multiple Use Act which provides for sustained-yield management. Timber management plans should provide for an even or non-declining flow of national forest timber and other benefits, to facilitate the stabilization of communities and to create opportunities for employment. They must also consider coordination of timber production and harvesting with other uses of national forest land. The 1976 Act set into law several changes which provided additional discretion for the USFS in defining practices for specific harvests. Additionally, the act clarified previously contested language as to the legality of clearcutting. The new Act specifically allows clearcutting but sets standards for USFS control of how clearcutting is carried out.

Erosion control is taken into consideration when designing a timber sale. Transportation systems are planned in advance of proposed timber sales. Both permanent and temporary road systems needed to log the sale are reviewed by an engineer, hydrologist, soil scientist, and/or forester. Once the sale is made, there are various timber sale contract clauses that are designed to protect the resource and prevent any resource damage. The USFS identifies areas where harvesting may be unacceptable such as steep topography. These lands are classified as marginal.

The 208 program underway at designated state and local agencies has been discussed elsewhere in detail. The 208 planning process requires that an evaluation of best management practices be made for all nonpoint sources including those associated with silvicultural activity.

State

States in the Basin have mechanisms similar to that of USFS with respect to state agency management of state forest land. Legislative arrangements for control of private forest practices on private land are quite limited. These statutes do not provide for mandatory control of private actions. Rather where they do exist they focus on incentives to promote forestry or regulations to prevent adverse impacts of harvesting on neighboring lands (e.g. slash disposal regulations).

Trend

Control on timber production in the foreseeable future appear to be unlikely in the Great Lakes Basin beyond those which are already in effect through public agencies responsible for forest land management.

OBSERVATIONS

It appears that issues related to water quality impacts of timber harvesting activities, though valid by themselves, may be but one component of a larger ongoing controversy; namely the conflicting uses to which public forest lands are put by economic interests on the one hand and by recreation and conservation interests on the other. If this is true the implementation of mechanisms to assure use of best management practices in timber harvesting may represent

only a negotiated agreement as to resolution of part of the continuing controversy.

From an institutional viewpoint the emerging issue in this area is similar to that which emerged from analysis of several other land use activities. Controls vary in their appropriateness to specific situations. Agencies charged with furthering the public interest have been made responsible for seeing that sound practices are implemented. Yet agency self regulation may not be sufficient to assure good management is brought about.

Canadian federal jurisdiction over forest management including logging operations and timber road-building practices as they may affect water quality from sedimentation is limited. This is in part due to the fact that most forested areas in Ontario are on provincial Crown lands and thus are subject to provincial jurisdiction. However, recent judicial decisions have interpreted certain provisions of federal legislation respecting fisheries protection from logging operations as being within the power of the federal government. Other provisions of the same legislation could be construed to provide the federal government with at least selective capacity to control such operations. However, there is little evidence of the use of such provisions at the federal level for control of sedimentation from logging in Ontario.

Canadian federal control of pesticide use in forested areas has recently been strengthened to supplement existing provincial requirements. Such provisions are too new to evaluate for effectiveness in practice. Difficulties with aspects of the federal approach include the permissive nature of some environmental information requirements where changes in ingredient rates are proposed prior to permitted use.

It would also appear that federal agency fiscal assistance programs, such as the recent DREE general and subsidiary agreement initiatives on forest management, do not explicitly pre-condition their funding on assurance that proper sedimentation controls will be implemented. If prospective forest access road construction agreements are silent on such matters, the federal government may well be in the position of subsidizing nonpoint pollution; not controlling it.

Forest management activities that can give rise to water pollution problems include timber cutting or harvesting; log transport; inadequate regeneration; and timber road building. Current Ontario legislation does not create a duty to control water pollution from these activities and may be inadequate partly because of this and partly because of insufficient resources and manpower. For example, Crown timber licences do not normally contain any provisions setting down how the licensee is to control erosion and sedimentation during cutting or related operations.

Similarly, while regeneration is seen by MNR to be a key for local water quality protection, regeneration on some Crown management units has been inadequate in part because of insufficient MNR field resources as well as the clearcutting practices of some logging companies.

Timber road-building erosion and sediment control has also been difficult to systematically establish on the extensive network of such roads on Crown lands. Many professional foresters regard the worst threat to water quality resulting from logging as that of accelerated erosion caused by "poor road construction and logging techniques and the improper use of machines".

New environmental assessment requirements are expected to help control erosion and sedimentation problems associated with forest management, though there is no experience to date. Environmental assessment requirements are usually applied to large scale developments, and new Environmental Assessment Act therefore may not be an effective substitute for a statute directed to control of sedimentation from many smaller forest management activities. It may be problematic at this early stage of the Environmental Assessment Act's evolution to ascertain whether general conclusions under generic assessments are adequate and enforceable substitutes for site specific sediment controls.

RECREATIONAL AREAS

OVERVIEW

Control of water pollution from recreational activities on public lands rests primarily with the agencies charged with general management of those lands. Control is attained through publication of rules to which recreation facility users are subject. Control of water pollution from recreational activity on private land is considerably more complex and ranges from specific prohibitions which apply to individuals engaging in recreational activity to controls on environmental effects of recreational developments (e.g. beaches, ski resorts, campgrounds or on land use impacts of second home development).

Some recreational activities are associated with use of pesticides and private sewage disposal systems. Controls on pesticide use and on-site sewage disposal are discussed above at pages 17 and 49 respectively.

CANADA

Federal

Recreational areas under federal jurisdiction include national park and Indian reserve lands. The National Parks Act, administered by the Department of Indian Affairs and Northern Development, authorizes the development of regulations for the preservation, control and management of national parks; the protection of fish, including the prevention and remedying of any pollution of waterways, and the establishment, operation, maintenance and administration of utility, sewage, garbage and related works.

An agreement entered into in February 1975 between Canada and Ontario respecting the Rideau-Trent-Severn river system (known as CORTS) attempts to balance the 425 mile-long corridor's recreational development with pollutuon control objectives.

Ontario

Pollution from recreational areas is addressed by a variety of provincial statutes, including those pertaining to water quality protection, pesticide use, provincial park and public land management, private development under the municipal planning process and prospectively environmental impact assessment evaluations.

Trend

It would appear that in the foreseeable future there will be increased pressure for more recreational land development and use in Ontario. Under these circumstances, the principal tool to which the province will turn will be the Environmental Assessment Act. It is anticipated that the types of MNR projects that will gradually be subject to the Act's scrutiny over the next few years include lake development plans (cottaging), and camp sites on Crown lands, master park plans and outdoor recreation trails.

UNITED STATES

Federal

Several federal laws administered by U.S. Department of the Interior are concerned with the provision of basic recreational needs, (e.g., Land and Water Conservation Fund Act of 1965, or the Wild and Scenic Rivers Act of 1968). A variety of other statutes (e.g. PL 92-500) may influence various aspects of recreational activities as they contribute to pollution from nonpoint sources even though such laws are not directed specifically at pollution control from recreational activity. Environmental review of federal or federally funded recreational projects is required through NEPA.

Funding levels for the Land and Water Conservation Fund have recently been significantly expanded. The fund is the major source of land acquisition revenues for federal, state and local outdoor recreation projects.

State

Control of water quality degradation from recreational activity is approached in several major ways. First, reactive pollution control mechanisms to abate specific instances of pollution through stream pollution control laws are available in all states. Water quality standards and regulations apply to parks, cottages, second home developments, and other recreational land uses but such controls are most effective in control of point sources of pollution or highly visible and descreet instances of nonpoint pollution.

A second approach involves regulation of construction-associated sedimentation. Local sedimentation control ordinances exist in a few localities in the Basin. Statewide erosion and sedimentation control programs exist in Michigan and Pennsylvania which among other things, deal with erosion and sedimentation resulting from construction of ski resorts, recreational beaches, parks, and other recreational areas. A major drawback in this approach is the lack of adequate control over daily individual activities. Erosion and sedimentation control ordinances do not specifically cover individual recreational users, such as families on outings or persons with all-terrain vehicles traversing undeveloped area.

A third method to control the effects of recreational land uses on water quality involves limitation of personal activities with respect to designated recreational areas. These statutes may regulate the use of offroad recreational vehicles, motorcycles in nonpaved areas, skiing and snowmobiling, and other activities. Because most recreational activities are of recent origin, many States have yet to formulate personal behaviour standards for these activities.

State and national park management agencies have begun to regulate recreational vehicle flows through parks and the numbers of visitors allowed into campingareas in order to control adverse effects on animal and plant life.

Minnesota, Michigan and New York prohibit snowmobile operation in areas where damages to vegetation and terrain may occur. However, the development of non-motorized zones to protect wildlife and other ecological systems, although being proposed in many areas, has not been used extensively.

New York and Minnesota restrict snowmobile use in forest preserves to designated trails and prohibit their cross-country travel. Michigan is currently studying environmental damage resulting from recreational activities as well as public responses to regulations. Most States require off-road recreational vehicle registration. For most of the other recreational activities, few State-level regulations currently exist.

Shoreline management programs such as exist in Michigan, Wisconsin and Minnesota offer potential leverage in controlling water degradation resulting from recreational use of shorelines. In Michigan, for example, local shoreline zoning is required in designated areas. If no action is taken at the local level to zone shorelands for protection of designated high risk erosion areas the State can establish their own regulations to prevent unwise use of such properties. The main aim of the program is to reduce the financial losses which occur in such areas from structural collapse of buildings in erosion prone areas. However, although zoning may afford a measure of control over shoreline erosion and subsequent degradation of nearshore waters, it will also affect cottage and second home development, shoreline recreational uses--including off-road vehicles--sporting events, and other activities in high risk erosion areas.

Use of local zoning is also encouraged in Michigan as a tool to control adverse impacts of recreational development on streams and rivers through the Natural Rivers Act of 1970. Provisions of the program are similar to the shoreland management act in that if after designation as a natural river, local units fail to adopt protective zoning measures (e.g., setbacks) the state would adopt an ordinance in lieu of local controls.

Trend

As demand for recreational space and the diversity of recreational activity increase, additional use of local/state controls on development such as those provided for by the Natural Rivers Program and the Shoreland Management Program described above are likely. Expansion of the Land and Water Conservation Fund suggests that in the coming years the rate of development of outdoor recreation lands will increase. Additional intensity of use of public recreation lands will bring about increased use of prohibitions on specific recreational activities in specified areas (e.g., snowmobile and all-terrain vehicle prohibitions).

OBSERVATIONS

In Canada, recreational lands under federal jurisdiction include national parks and Indian reserves. Septic tanks and related systems are the sources of most water pollution on these lands. Though provincial laws do not normally apply to national parks and Indian reserve lands, provincial standards for septic tank pollution are often the yardstick which federal agencies use (See PRIVATE SEWAGE DISPOSAL).

Federal control of water pollution in recreational areas under federal jurisdiction, moreover, depends to a high degree on cooperation between the non-environmental agencies responsible for administering the lands, and agencies with environmental expertise. Generally, agencies with an environmental control function act in an advisory capacity only.

Water pollution in recreational areas (e.g. pesticide use, recreational motor vehicles and private waste disposal) may be controlled at both the planning and operation phases. Through the municipal planning process, environmental agencies can recommend limits to cottage development on lakes that have reached their carrying capacity. In Ontario, planning tribunals have been known to accept such arguments and limit lake cottage over-development, even where local government was satisfied with a development plan.

Provincial government encouragement of motorized recreational vehicle use on provincial park and other public lands has increased in recent years. It is unclear whether the implications for water quality from increased erosion and sedimentation arising from such vehicle use in these areas were considered when this policy was under consideration.

The majority of permits for pesticide applications to water in Ontario come from recreational communities. Special spray programs have also been developed where threats to public health have been perceived (e.g., from encephalitis-bearing mosquitoes). Some municipal officials have doubted the effectiveness of spray programs, despite public pressure to have the programs carried out.

The difficulties in control of pollution from recreational activities do not lie with formulation of regulations, but rather in establishing control procedures to insure observance of the regulations. Parks or other public lands can be partially managed by regulating visitor flows through recreational areas. However, for many recreational areas not included in state or federal park systems (e.g., state or national forest land) the ability to control traffic is limited to on-site monitoring and inspection or enforcement of complaints. Thus, in instances where off-road vehicles traverse lands subject to erosion and sedimentation, it is currently difficult to provide sufficient monitoring to insure compliance with evolving State programs addressed to this activity.

Unlike agricultural extension services which assist in generating voluntary compliance by farmers with land-use practices for the reduction of sedimentation, there is no currently established program to foster specific land-use management practices for individuals in their pursuit of recreational sports. It is difficult at present to foresee widespread programs which would generate voluntary compliance with recreational standards aimed at prevention of adverse effects on water quality.

One alternative method may be the banning of certain recreational activities such as off-road vehicle use on lands not designated for their use. However, this is difficult to enforce in many undeveloped and isolated areas without generating undue costs in terms of manpower. Moreover, the concentration of such uses in limited areas may create a more severe environmental hazard than their dispersed use (albeit uncontrolled) throughout the Basin.

In the U.S. an issue of increasing importance is the compatibility between land use activities on public recreational lands and nearby privately held lands. Much public recreation or forest land is intermingled with private holdings in a checkerboard ownership pattern. Thus, private development which may have an adverse effect on public holdings, can be undertaken without a public voice in development decisions. There is a need for a mechanism to resolve these public/private conflicts. The Federal Land Policy Management Act of 1976 addresses this in terms of requirements for coordination of federal planning with local and regional land use planning. It remains to be settled, the extent to which federal actions should be consistent with local and state land use plans.

LAKESHORE AND RIVERBANK EROSION

OVERVIEW

Lakeshore and riverbank erosion are natural processes which are subject to substantial acceleration due to some human activities.

Institutional arrangements to control lakeshore and riverbank erosion have generally focused on corrective programs to provide or construct erosion control structures. This activity itself may have adverse water quality effects. Though corrective measures are still utilized, more recent efforts have been more preventive with an emphasis on planning and land use controls to limit use of the shorezone or stream corridors and to discourage those activities which would accelerate the erosion process. Neither of these approaches specifically address water quality protection, though benefits to water quality can often result from preventive action.

CANADA

Federal

Under the authority of the Agricultural and Rural Development Act, special agreements between Canada and Ontario have been entered into for the construction of dykes in several townships and municipalities in the Basin in order to protect farmland from flooding.

The Department of Public Works (DPW) Shore Protection Remedial Works Program is directed to the construction of protective works along navigable waters where waves from commercial navigation cause erosion, or where a federal structure is deemed to be the cause of erosion. Remedial works usually consist of dykes and bank stabilization measures. Most of the remedial work done by DPW in the Basin has been concentrated in the City of Thunder Bay and on the Detroit and St. Clair Rivers.

Under the Canada-Ontario Shore Damage Survey, the nature and extent of damage to the Great Lakes shoreline and connecting channels from flooding and erosion in 1972-73 was reviewed. Objectives in addition to this included recommendations for shoreline management and planning. Recommendations arising out of the Survey included use of shoreline hazard land designations in official plans; and development of an acquisition policy for such lands within the overall framework of a coastal zone management policy.

Ontario

Provincial statutory and administrative programs that relate to problems of lakeshore and riverbank erosion include: selected municipal planning and designation procedures, in consultation with Conservation Authorities, for hazard lands and other areas where improper shoreline development can lead to water quality problems; low-interest loan programs to finance preventive or remedial works, such as retaining walls, dykes, breakwaters or other structures, where shoreline property has been damaged or eroded by the elements; private and Conservation Authority dam construction and erosion control projects; and prospectively, individual and class environmental impact assessment review of Conservation Authority projects respecting bank stabilization, new dams and reservoirs, dam reconstruction involving a change in use, dykes, levees, pumpland projects, channel improvements and watercourse diversions.

Trend

Apart from follow-up studies arising out of the Canada-Ontario Shore Damage Survey no new significant federal initiatives are anticipated. The principal change from past practices at the provincial level would appear to be application of the Environmental Assessment Act in an individual or class review capacity. Contradictory efforts respecting hazard land designation in municipal official plans and increased pressure for development on the fringes of flood plains also appear likely.

UNITED STATES

Federal

Structurally oriented programs to control lakeshore and riverbank erosion are conducted by the U.S. Army Corps of Engineers (COE) and the U.S. Soil Conservation Service (SCS). SCS projects focus mainly on riverbank erosion problems and are implemented through a number of USDA programs for financial assistance. The small watershed program under PL 83-566 is one that is in broad use. Projects completed under these USDA programs usually provide other land or water conservation benefits and are not solely directed at streambank erosion. Most of the COE programs in this area are intended to provide relief for lakeshore property owners threatened with erosion losses.

Two other major federal programs can be used to promote development of preventive mechanisms to respond to shoreland and riverbank erosion problems. The Coastal Zone Management program is the major effort in this area. Provided for by the Coastal Zone Management Act of 1972, the federal program is intended to encourage states to develop comprehensive planning processes for their shore zone areas in conjunction with affected local governments. Lakeshore erosion problems are among the several that the planning programs address.

The National Flood Insurance Program established by the National Flood Insurance Act of 1968 and made mandatory through economic sanctions by the Flood Disaster Protection Act of 1973, is directed primarily at reduction of flood and erosion risks by preventing future development in flood and erosion prone areas. Though not specifically intended to address riverbank erosion or water quality, the program will serve to discourage location of development on lands which may be particularly subject to riverbank erosion.

The 1973 amendments to the National Flood Insurance Act of 1968 also provide protection under the standard flood insurance policy for structural and contents losses caused by abnormal shoreline erosion.

State

Under the Coastal Zone Management Program noted above, the Basin states are each developing a planning process to address coastal zone issues within their jurisdictions. As part of these programs legislative controls pertinent to implementing each states program are being indentified and where appropriate new legislation is being considered.

Several states (Minnesota, Wisconsin, and Michigan) already have shoreland zoning and management programs which address the need for special land use policy and control in shore zones. The Illinois legislature has before it a proposed state coastal zone management bill which would complete the statutory basis for the program developed through the state's coastal zone planning process.

In regard to flood plain management Indiana and New York have programs which address flood plain development and could reduce potential riverbank erosion problems. Shoreland programs noted above in Michigan, Wisconsin, and Minnesota also apply to actions in flood plains.

Substate

Structural programs to control riverbank and lakeshore erosion problems are undertaken by several types of special purpose districts or local governments in all the states. These include conservancy districts in Ohio and Indiana and drainage districts in Michigan. Such local projects are sometimes though not generally carried out in conjunction with federal financial assistance through SCS as described above.

Through their police powers, general purpose units of government have authority to control land use activities in flood plains and shore zone areas. Generally, although significant local initiatives have occurred, these powers are only exercised in response to state incentives.

Trend

No significant departure from present activities appears likely to occur. State and federal incentives through coastal zone management programs should provide for continued emphasis on preventive measures to avoid use of shore zones and flood plains that accelerate the erosion process. Receding lake levels will lessen the pressure for massive programs aimed at implementing corrective measures. In all of these programs water quality issues are likely to receive only incidental continuing attention.

OBSERVATIONS

Activities in this area are not characterized by a desire to protect water quality per se. It does not appear water quality effects of lakeshore and riverbank erosion would become great enough to encourage action until significant other major nonpoint source pollution problems have been solved.

Moreover, there is potential for conflict of interest within the agencies involved in this area since on the one hand they are charged with acting in the public interest to protect the environment while on the other hand they are primary contributors to sedimentation through their earth change activities.

Canadian federal control of erosion and sedimentation is limited to the Department of Public Works shore protection program. This program is activated where the majority of erosion is caused by commercial navigation or federal activities or facilities. Follow-up studies arising from the Canada-Ontario Great Lakes Shore Damage Survey constitute the other principal federal involvement in the problem of erosion.

A broader involvement in erosion control could be based upon the federal government's responsibility for inland fisheries and international and interprovincial waters.

Certain projects involving federal funding or land management programs themselves may lead to erosion and/or water quality impairment, which must in turn be rectified through the use of further federal funds.

The province has no active program of long-term shore protection. It has, however, expended over twelve million dollars since the spring of 1973 on remedial and emergency works for Great Lakes shore damage through its shore property assistance program. Ontario is also engaged in continued joint studies with the federal and other levels of government to develop methods for evaluating such shore management alternatives as land use controls, long and short-term protection, and acquisition of hazard lands. It has also undertaken a 5-year multi-million dollar program of acquisition of shorelands for use as future open space.

Conservation Authorities are frequently responsible for the management of these lands. The Authorities recognize the need for shoreline management to minimize erosion and resulting sedimentation. However, some of the policies of the province and some Conservation Authorities may work at cross-purposes where water pollution control is at issue.

For example, the province may on the one hand support the defining of hazard lands (usually defined as erosion and flood-prone areas) and their incorporation into municipal official plans and zoning bylaws. On the other hand, it states that in the past it may have been too restrictive respecting development in flood plain areas.

Similarly, Conservation Authority goals for shore and hazard lands extend from limiting erosion at the land/water interface to developing shorelands for public recreational use. Recreational development of such lands can mean landfilling of these areas. Landfilling can lead to a diminution of local water quality as well as to the expenditure of shore protection funds to protect landfill projects.

Conservation Authorities also provide streambank erosion control assistance to private landowners upon request and where budgets permit. Measures may include channel modification and streambank stabilization.

In a few instances, some Authorities in rural watersheds have required, as a condition to assistance, that the property owner agree to develop vegetation buffers and prevent livestock access to the streambank.

Some Authorities regard erosion control assistance as ancillary to their central task of flood protection, but valuable in promoting long-term water quality. In the short-term, during the installation of channel works or modifications, Authorities indicate that downstream water can become quite silt-laden.

While erosion control assistance is available from most Authorities, a minority of Authorities do not regard water pollution control as one of their functions.

Seventy-five percent of private dams constructed in southern Ontario lakes and rivers as of 1970 did not have prior government approval. The poorly designed and constructed among these can be sources of erosion and sedimentation. Gaps in existing legislation, its administration and enforcement have been cited by a Ministry of Natural Resources task force as impediments to better controlling these works.

In a recent study, several of the Great Lakes states agreed that the erosion protection provisions of the National Flood Insurance Program do not provide a workable solution for the prevention of shoreline erosion damages. The states have concluded that the process of shoreline erosion is not "insurable" because the risk of damage ranges from 100 percent at the bluff edge to zero further inland. As a result, there is no incentive for the pooling of risks, inherent in all insurance programs. Thus, erosion hazards not directly related to innundation do not fit within the National Flood Insurance Program.

A close examination of this problem emphasizes the thin line that often separates the problem from the solution. In this area many of the structural measures intended to prevent erosion of shoreline or streambank areas also create sedimentation problems through their initial construction (see the discussion of drainage and shoreline landfilling activities on this point). This historically poor performance (especially for lakeshore erosion control) has perpetuated their continual reconstruction and in turn exacerbated lake water pollution. In addition to the natural erosion which is not abated by the attempted solutions the adverse impacts of continuing construction activity must also affect nearshore water quality. Recently, low cost structures and natural vegetative stabilization have been the subject of study by shore erosion research organizations. It remains to be seen how warmly the agencies chiefly involved in implementing structural controls (e.g. Conservation Authorities, SCS, COE, conservancy districts) will embrace innovative concepts in erosion management. Such agencies may prefer to rely on familiar solutions even though they have been shown to be inadequate in some instances rather than to utilize new techniques which have not yet been widely used.

3. INSTITUTIONAL FINDINGS BY POLICY ISSUE

A major problem in achieving improvement in nonpoint source pollution control is that of reorienting the institutional system to respond to the inherently complex and interrelated nature of pollution from land use activities. The observations of Section 2 suggest that there are some institutional patterns which are recurrent across several categories of land use. Adjustment of the institutional system in this respect will require consideration of problems pertaining not only to each land use category but also to several factors which are common to the administrative mechanisms which have evolved to control these problems. The following selected issues should be borne in mind in developing a non-conflicting pollution control program for nonpoint sources.

THE SEPARATION OF AGENCY AUTHORITY FOR DEVELOPMENT PLANNING AND WATER POLLUTION CONTROL MAY INHIBIT THE EFFECTIVENESS OF NONPOINT CONTROLS.

Agencies responsible for water pollution control do not necessarily have legislative authority to deal with pollution from land use activities such as that related to new urban development. Water pollution control legislation in Ontario, administered by the Ministry of Environment (MOE), is directed primarily to permit and approval control of point source discharges. With respect to The Environmental Assessment Act (EAA), which provides MOE some basis to go beyond point source controls, the Minister of Environment has clearly stated to the Ontario Legislature that the EAA would not have general application to the residential housing industry. Conservation Authorities have preventive pollution control authority (e.g. permits) over development activity in mapped floodplain and scheduled areas under their regulations. However, a study for the Ministries of Housing and Natural Resources respecting the province's floodplain management/critiera recommended that a municipality be given the option of being exempted from construction and filling regulations under The Conservation Authorities Act, once it has adopted similar control procedures through its zoning by-laws. Municipal law is generally silent on control of pollution from construction site runoff, though some control may be exercised through subdivision agreements between municipalities and developers.

The principal control instrument in Ontario for such land-disturbing activities is development planning legislation. The Planning Act requires that municipalities undertake official land use planning, zoning, subdivision and redevelopment control subject to Ministry of Housing, and in some cases, regional government oversight.

One result of this separation of authority for development planning and pollution control functions is that environmental agencies have

sought to incorporate environmental constraints (e.g. sediment control) through mechanisms already established under The Planning Act. However, this gap can only be bridged where there is great cooperation between agencies responsible for these two mandates. This cooperation may not always be forthcoming, since the agencies with basic authority (e.g. Ministry of Housing, municipalities and in some cases regional governments) have no corresponding duty to protect water quality. Apart from the very obvious problem that agencies with the greatest environmental expertise have the least legislative authority under the municipal planning process, difficulties may arise because of 1) the growth-development pressures on, or predilections of, local governments inhibiting effective and systematic implementation of environmental controls; 2) municipal by-laws and engineering practices which are or may be contrary to silt and stormwater controls; and 3) the province's own pro-development policies. A similar separation of authority may be observed with respect to control of pollution from septic tanks (see Pages 49-55). Further, with respect to extractive operations, agencies with pollution control responsibility are not the same agencies charged with rehabilitation and reclamation responsibilities.

PL 92-500, WHICH PROVIDES FOR INTEGRATION OF PLANNING WITH POLLUTION CONTROL MAY NOT IMPOSE AN ENFORCEABLE LEGAL DUTY TO IMPLEMENT AN ADEQUATE PLAN UNDER SECTION 208.

The split in planning and pollution control authority in Ontario which results from the exercise of control over local land use and development decision making without a corresponding duty to protect water quality is given an odd twist when considered in the framework of U.S. planning and pollution control.

In the U.S., land use planning and development decisions are made by local governments largely without reference to state agency approvals. As is the case in Canada, most responsibility for pollution control rests with agencies at the state level. Thus, there is a division of responsibilities by levels of government. A major U.S. effort to link planning and pollution control efforts has been through the areawide water quality management planning process under Section 208 of PL 92-500. Under the US EPA regulations, state and designated 208 agencies must prepare water quality management plans which address a variety of nonpoint source pollution problems and, as appropriate, develop mechanisms (including land use controls) by which these pollutant sources may be brought under control. The resulting 208 plans are to be locally approved, in designated 208 areas approved by the Governor, and then certified by the regional US EPA administrator. A major consideration in development of these plans is that the implementation of the plans must follow their adoption. Yet the 208 approach, however effective it may be as a mechanism to establish a planning process for water quality management at both state and local levels, is fundamentally weak with respect to provisions that will enforce the implementation of adopted 208 plans once developed.

US EPA's role in this process is that of grant administrator and provider of technical and information assistance. US EPA has no direct implementation power. The mechanism by which enforcement of the 208 plans will occur has not been clearly spelled out. Several possibilities exist.

(1) In its grant administration capacity US EPA has authority to withdraw the grant or suspend payment of additional grant monies if the planning agency does not meet the terms of the contract and the 208 regulations. Two major limitations with this remedy are: (1) problems are not likely to emerge until after most planning grant funds have been spent. Reimbursement of spent funds would likely be difficult to enforce. (2) Even if the grant had substantial funds remaining or if award of a subsequent grant for continuing planning could be withheld, stopping work only makes implementation less likely. This may provide local officials with the justification of eschew further commitment to a fledgling program. State capability to assume responsibility for implementing local 208 plan elements may be severely limited.

(2) Language of the Act indicates that the regional administrator may withhold Section 201 grant funds from communities which are not faithfully implementing 208 plans or which act in contravention to a certified plan. Though it is difficult to evaluate the extent to which US EPA would utilize this mechanism, it is not unreasonable to suggest that the agency would probably prefer to avoid the kind of confrontation that its use would likely precipitate. Clearly the effectiveness of withholding 201 funds as an enforcement device would be a function of the extent to which local officials believed US EPA would actually use the withholding of funds. Even if funds were withheld it is difficult to see how this would provide necessary leverage to attain action unless the unit of government from whom funds were being withheld was also the party responsible for 208 inaction and further, that that inaction related directly to wastewater treatment or sewerage extension issues. Consider a situation involving failure to act by soil conservation districts to control pollution from agricultural runoff as called for by a 208 plan: withdrawal of 201 money in that region would mean little to the farm community and would be likely only to exacerbate urban-rural differences.

(3) A third enforcement option not implied directly by the Act involves the states. Upon certification, the state becomes a formal party to the 208 plan whereby the governor has a commitment to see that provisions of the plan are carried out. States have at their disposal a wide variety of tools to provide incentives for local 208 implementation, e.g., fines for municipalities that fail to comply with state pollution control laws, withholding of state grant funds or assistance programs. State inclination to use this authority thus far cannot be evaluated. The cautious approach of the states to

approval of 208 plans could be viewed as an expression of concern that implementation problems may result from plans over which they have had little direct control.

(4) Amendments to federal statutes or regulations could make receipt of non-EPA federal financial assistance (e.g., Highway & Airport funds, HUD Community Development funds, 701 planning funds, CETA or EDA funds) contingent upon 208 implementation. Many declarations have been made as to the importance and priority of Section 208 planning but it is unlikely that any move to implement sanctions of this nature would receive support. Sanctions of a generally parallel nature are scheduled to be employed through the Flood Disaster Protection Act where communities not participating in the National Flood Insurance Program will not be eligible to receive financial assistance for acquisition or construction by federal agencies or real estate loans by federally supervised lending institutions for buildings within an identified flood hazard area.

Moves to impose any of the last three sanctions would probably result in challenges from local governments to the veracity of the plan developed by the designated agency. Procedural and methodological weaknesses could be cited which could cast doubt on the conclusions reached. Also, despite the attention to public participation, the short time allowed for plan completion makes most agencies susceptible to charges that plan conclusions were reached without substantive opportunity for public and local official involvement and influence.

The difficulties inherent in 208 enforcement when combined with 1) the severe time constraints to be met by the planning agencies and 2) the political difficulties local officials may have in accepting a program developed by a regional agency which may be viewed at best with some suspicion, suggest that the implementation of 208 planning will be neither automatic nor immediate. Moreover, the implementation requirements inherent in the planning process may in fact result in the tendency of the 208 agencies to adopt a "stand pat" posture since officials will be uncertain about nearly any substantive water quality program that would bring social or political change. The logical course of action for local officials and regional agencies (whose very existence depends on local government participation) is to work out a program that will meet the procedural requirements of the 208 Grant but not limit future local options.

ENVIRONMENTAL ASSESSMENT LAW MAY NOT BE AN EFFECTIVE SUBSTITUTE FOR SEDIMENT CONTROL LAW.

Through the use of individual and class environmental assessments under the EAA, Ontario will attempt to achieve ancillary benefits of sediment control for a number of land use categories, particularly transportation corridors and forested areas. The use of class environmental assessments will especially be employed for the many smaller projects under these

categories. Because the EAA has only recently become law, it is difficult to ascertain whether general conclusions under a class assessment will be adequate and enforceable substitutes for site specific reviews conducted under a sediment control statute.

A class environmental assessment, according to the MOE, is an environmental assessment carried out on a category of projects having certain special characteristics which allow them to be grouped together. MOE describes such projects as usually relatively small in scale, similar in nature, predictable in effects, and of frequent occurrence. To be grouped into a class, the projects would have to have a common set of procedures for planning, construction and implementation (e.g. rural highway widenings).

The purpose of the class approach, according to MOE, is to allow application of environmental planning principles to projects which are too numerous for individual environmental assessments, and yet have environmental effects which are significant enough to warrant application of the Act.

The advantages of the class approach are said to be a consolidation of documentation, review and approval procedures as well as provision for before-the-fact evaluation of the effects of the projects within the class.

However, the class environmental assessment approach would also appear to have a number of disadvantages that may cause special problems for the systematic incorporation and effectiveness of sediment controls. For example, the MOE notes that since a class environmental assessment deals with a group of projects, "it cannot be as specific about the characteristics or effects of a particular project, as an individual environmental assessment would be." Rather, the class assessment would be prepared identifying the range of environmental effects likely to be associated, "at least in some circumstances, with the projects in the class." The class assessment would also identify, or develop measures to prevent or mitigate, adverse effects, including alternatives.

While this process review will be of value, class assessments, as substitutes for individual site specific sediment control review, may pose difficulties. Even if such project types underwent class or program assessments to define general procedures to be followed on smaller projects, such a general approach may not be sufficient to determine, for each individual project, what should be done to prevent and abate nonpoint source water pollution. There may be many local factors such as slope, soils, vegetation, rainfall, etc. and different combinations thereof that class assessments not only may not have taken into account but for which the general recommendations might be wholly inappropriate. By analogy, the mining industry has frequently argued that mining operations and local environmental conditions are so diverse that each mine must be examined in relation to the actual local environment.

Nor is it clear from the EAA how general conclusions reached in a class assessment, would be enforced with regard to each of the smaller activities that comprise the class.

The MOE indicates that acceptance by the province of a class environmental assessment leads to approval to proceed with the projects within the class, subject to the use of the methods outlined in the document, or any other conditions attached to the approval. Conditions of approval might include: a requirement that the proponent submit some type of report on each project; a requirement for monitoring by the proponent, or MOE; some mechanism for "elevating" individual projects within the class to an individual environmental assessment, and an expiry date allowing for re-assessment after a few years experience.

With respect to the issue of enforcement and monitoring, the MOE indicates that while it is possible that the proponent agency may be partly responsible for monitoring, MOE will be involved "to some extent in order to ensure that the proponent lives up to the conditions of approval." A class environmental assessment will normally contain a method for reporting to MOE on individual projects within that class. MOE suggests as an example, that an environmental study report (undefined) might be submitted for each project prior to implementation to allow MOE to see how the procedures described in the class environmental assessment documents are to be carried out for each project. "Such reports will likely be a condition of approval on all class environmental assessments and copies will be provided to the appropriate ministry and regional offices for monitoring and enforcement purposes".

The MOE decision to incorporate, through the EAA, general environmental planning principles into all projects within a class is an important one. The approach may go a long way toward instilling an environmental ethic into the way proponents carry out such projects. However, it is submitted that serious problems may persist with this approach in ensuring that comprehensive sediment control systematically takes place on all such "minor" projects:

(1) Much of the detail surrounding how class environmental assessments will be used, in practice appears to create a whole new environmental approval process within the EAA. This "approval within an approval" does not appear to be explicit in the Act for those individual projects for which no environmental assessment was performed other than a class one. It may be arguable, under such circumstances, whether the courts, if the occasion arises, would uphold so sweeping an extension of approvals power which had no explicit reference in the Act.

(2) The use of the EAA class assessment approach as a substitute for a statute directed to sediment control could result, in many instances, in a relatively proforma or perfunctory sediment control plan and field review. This would appear to be the case because of the large number of parameters likely to be dealt with under environmental assessments generally, of which sediment control is only one subset.

(3) That environmental assessment statutes may not be adequate substitutes for statutes directly related to sediment control is suggested by the fact that a number of U.S. states have both environmental impact and sediment control laws. States which possess both types of laws include, Virginia, Hawaii, Maryland, Montana and North Carolina.

Nonetheless, it is probably still too early in the evolution of the EAA to judge whether the Ontario class environmental assessment approach can be an adequate mechanism for determining and ensuring the appropriate mix of sediment control measures on a site-by-site basis.

THE TRADITIONAL ENFORCEMENT PROCESS FOR POINT SOURCE POLLUTION CONTROL MAY BE INADEQUATE FOR EXTENSION TO CONTROL OF NONPOINT SOURCES.

Public attention to several recent pollution incidents in the Basin involving disposal of toxic wastes and groundwater contamination raises the question of the effectiveness of present regulatory programs for environmental protection. Some evaluation of this enforcement system must be factored into any initiatives to broaden controls to include sources of pollution not now regulated.

Two factors bear special attention. First, nonpoint sources are dramatically different from point sources in terms of demand on the enforcement process. A clear link between the condition of a stream and a specific land use activity is often difficult to document. In situations where relationships can be documented, pinpointing specific individuals may still be difficult since many individuals may be making small contributions to a pollution problem without any one individual having a clearly identifiable discharge. Moreover, water quality standards may not be violated in many instances of nonpoint pollution because the pollutants may be time or space dependent (e.g. they may not pollute the stream to which they discharge but may later pollute waters to which they are ultimately transported. This phenomenon has been documented for Lake Erie in technical studies conducted by the 208 study for Toledo, Ohio and by the Buffalo District Corps of Engineers). Traditional notions of standards and enforcement may require considerable rethinking if they are to be effectively adapted to the dynamics of nonpoint source pollution.

A second issue is the imperfect record of enforcement procedures themselves even as they are applied to control of point source discharges. Existing regulatory programs are limited by 1) administrative capability which may function to eliminate many polluting activities from the scope of procedural or substantive requirements and 2) agency procedures to ensure compliance which may preclude enforcement action in some instances of identified violations.

As was noted in the observations under FEEDLOTS, regulations for the US EPA permit program served to exempt the vast majority of feedlots from procedural requirements of PL 92-500. This exemption though administratively convenient in terms of federal and state agency staff availability

deprives the regulatory agencies of a systematic means of monitoring actions which may cause water pollution. In the absence of any other system of mandatory standards or notification, the regulatory agency must rely on an ad hoc identification of problem cases as a means to determine those operations (aside from the small percentage of operations which do meet criteria for mandatory permit requirements) which should have permits.

For those activities or dischargers where permit or other regulatory devices are clearly required, effective legal action to enforce the law in instances where standards or permit conditions are violated may not always be achievable. Enforcement is only one step in a complex series of actions associated with a regulatory program. A recently completed internal task force report on enforcement prepared for the Michigan Department of Natural Resources noted several factors which appear to have broad applicability to enforcement of water quality programs throughout the Basin. In particular the report found that too much emphasis on voluntary compliance through informal negotiations, conferences, technical assistance and other "service" oriented efforts could serve to not only weaken formal enforcement actions but also to make future cooperative compliance less likely (See Page 27 , FEEDLOTS, and Pages 77-78, EXTRACTIVE OPERATIONS). The potential economic gains which could accrue to violators who would seek to delay court action by negotiating time extensions, plan modifications and changes in permit conditions may be considerable. Further, the longer non-compliance with permit conditions is allowed to continue (for whatever justification) the more reluctant a court would be to take action to stop pollution since the violations had been known to the enforcing agency for an extended period of time while voluntary compliance was sought.

When already known problems of enforcement such as those noted above are combined with recognition of the inherently different nature of nonpoint source pollution, it becomes evident that a simple extension of the current approach for point source regulation to nonpoint sources deserves careful attention. Use of other regulatory techniques either in lieu of or in addition to traditional enforcement may prove effective. Such techniques which warrant further study include use of an effluent charge system adapted to nonpoint pollution control (see Page 12 CONSTRUCTION SITE RUNOFF) or use of expanded environmental right of action statutes (see THE IMPORTANCE OF AN ADVOCACY ROLE FOR THE PUBLIC IN THE ADMINISTRATIVE PROCESS SHOULD BE RECOGNIZED below).

Other initiatives in environmental permit procedures which may have application include the concept of the general permit for discharge of dredged and fill materials under Section 404 of PL 92-500 as developed by the Corps of Engineers (see page 74) and the adaptation of best management practices to conditions for issuance of permits for discharge of pollutants associated with agricultural and separate storm sewer sources. US EPA has published draft regulations (42 Federal Register 6846, Feb. 4, 1977) which would provide for use of best management practices as determined locally through 208 planning.

INTENSIFIED VOLUNTARY EFFORTS MAY NOT BE SUFFICIENT TO ADEQUATELY CONTROL NONPOINT SOURCE URBAN AND AGRICULTURAL POLLUTION.

Improved management of nonpoint sources of pollution will be dependent for several land use activities upon the effectiveness of individual and local government initiatives to engage in management practices appropriate to water quality protection. This situation has most application to individuals with respect to control of pollution from agricultural activities and to units of government with respect to control of pollution from construction site and urban stormwater runoff. In both cases the problems are common to a large number of individuals or jurisdictions throughout the Basin yet the solutions are best individually tailored to specific circumstances. Mechanisms available to precipitate widespread individual/local action involve on the one hand voluntary measures (e.g. fiscal assistance programs, technical and planning assistance and public information efforts) and on the other hand regulations and sanctions.

It would not be reasonable to suggest that new programs which are designed to integrate fiscal assistance measures, public education and technical assistance, would be ineffective in achieving water quality goals. However, it does appear that, with even the best of voluntary programs, there will be segments of the population unresponsive to desired behaviour changes. Two examples are instructive in this respect. The first applies to agriculture, the second to urban areas.

In the Canadian prairie provinces during the 1930's there was extensive participation by farmers in programs funded under the Prairie Farm Rehabilitation Act (PFRA) directed at reduction of wind erosion losses. With the return of good weather cycles the emergency atmosphere which surrounded the enactment of PFRA waned. Today under the Canadian Federal Farm Syndicates Credit Act funds are available for purchasing equipment or erecting structures related to erosion and sediment control. Federal officials in Ontario have indicated that in the province no funds have ever been approved for such purposes nor do they anticipate a significant demand for such funds in the future. In the United States the SCS program of technical assistance to farmers (through SCD's) for development of farm conservation plans has been underway for many years. A February 1977 Report to Congress by the Comptroller General, noting the "passive approach" of SCS in working only with those farmers who volunteer to participate in the program found that SCS spent much time "... to develop relatively elaborate conservation plans for individual farms. However, many plans GAO reviewed were outdated, forgotten by the farmer or just not used in making farming decisions". The GAO further states that the SCS "...did not routinely check with farmers to encourage them to carry out at least the more important parts of the plans and to revise them as conditions change. Follow-up visits were sporadic and generally not made unless requested."

It appears that in both Canada and the U.S. a substantial proportion of available financial assistance funds have supported farm practices which tend to enhance the farmer's economic return. Thus, Canada-

Ontario Agricultural and Rural Development Agreement monies have, since 1970, exclusively funded tile drainage or outlet drainage projects in Ontario. In the U.S. under the Agricultural Conservation Program administered by the ASCS, cost share assistance is available to farmers to install soil and water conservation measures. Some officials have expressed concern that there is too much support for low priority projects. A 1971 survey of ACP expenditures for Michigan revealed that many counties were allocating nearly all their funds to tile drainage work. For example, in Michigan's thumb area Huron County allocated 83% of its funds to tiling work; in Tuscola County the figure was 92%; Saginaw, 96%; Sanilac, 71%; Bay County, 93%. The 1977 Comptroller General Report noted above indicates that the passage of time since 1971 has not changed the ACP in this respect: "Much of the federal (ACP) money is not being spent on critically needed soil conservation practices having the best payoff for reducing erosion....In recent years less than half the funds have been used for conserving the nation's topsoil."

Concerns regarding past USDA funding practices would appear to have influenced Congress in establishing a program for water quality oriented financial assistance to farmers under the 1977 Clean Water Act Amendments. The Conference Committee Report (to accompany HR3199) states:

> "The conferees agree that the function of this cost-sharing program is to reduce nonpoint source pollution through financial assistance for only those soil conservation practices which improve water quality. It is not intended to be a copy or extension of existing soil conservation programs in the Department of Agriculture, and should not finance production-oriented practices except [as] an incidental or indirect result."

These examples illustrate the limitations of purely voluntary programs. Quite simply stated the farmer will utilize those programs which are economically advantageous to him. Water pollution resulting from agricultural practices generally has no adverse effect on the farmer's operation, thus provisions for loans or cost-sharing to control such water pollution are under-utilized.

An alternative to the voluntary approach is to adjust the rules by which all financial assistance is provided to the farmer so as to tilt the balance of the farmer's determination of economic advantage to the side of water quality protection. Thus the farmer's participation in traditional farm assistance programs (e.g. crop insurance, farm loans, price support payments) could be made contingent upon demonstration by the farmer that appropriate measures are in effect to control soil erosion and consequent water pollution.

The strong similarity between the position of the farmer in control of agricultural pollution and the position of the municipality in control of urban stormwater and construction site runoff suggests that reliance upon purely voluntary effort by municipalities to control these sources of pollution would be similarly limited. Experience in the U.S. since 1968 with the Federal flood insurance program seems to support the conclusion that the likelihood of municipal action in areas which are

not in their immediate self interest is low without the encouragement that sanctions provide. The 1968 Housing and Urban Development Act created a program of federally subsidized flood insurance. Under the National Flood Insurance Program individual property owners in participating communities can purchase insurance at subsidized rates. In order to participate in the program, communities must adopt certain floodplain management measures. The objective of the program was to first provide a smoother working mechanism for federal disaster relief payments and secondly, to reduce flood losses by encouraging community floodplain management. A Congressional Research Service Report prepared for the Senate Committee on Interior and Insular Affairs (entitled Congress and the Nation 's Environment January 1977, Publication No. 95-5) notes:

> As a voluntary measure, however, the flood insurance program did not become a significant part in the Federal disaster relief effort. Its lack of effectiveness led to the Flood Disaster Protection Act of 1973, PL 93-234, which expanded coverage available under the program and new sanctions introduced by the statute made it virtually compulsory for communities designated as flood prone.

Although PL 93-234 has not yet been fully implemented the addition of sanctions to the program is having the effect of bringing about local action that may not otherwise have occurred for several years if at all.

Implementation of programs for control of urban and agricultural pollution sources will involve actions by individuals and municipalities, each tailored to their specific situations. However, the benefits these programs provide to individuals and municipalities do not appear to match those which would accrue to society at large. Thus attention to actions by the federal or state/provincial governments to motivate appropriate action by the individual/municipality seems to be a logical course of action.

THE IMPORTANCE OF AN ADVOCACY ROLE FOR THE PUBLIC IN THE ADMINISTRATIVE PROCESS SHOULD BE RECOGNIZED.

The public may provide a valuable supplement to administrative agency control of nonpoint sources of pollution through involvement in:

(1) public or administrative hearings;
(2) advisory committees; or
(3) court actions.

Public hearings can be important forums where proponents of various land use projects can outline the nature of their proposals and their implications for water quality. Similarly, government agencies can explain details of their policies of approval and enforcement in relation to such land uses.

However, public hearings under Ontario environmental legislation do not cover the full range of land use activities that may be water quality problems. For example, under the EPA, public hearings are only required for waste management facilities for hauled liquid industrial or hazardous waste or any other waste the MOE determines to be equivalent to the waste of more than 1,500 people.

Public hearings under most Ontario environmental legislation only result in recommendations, not decisions. Where hearing boards are authorized to make a decision, Ontario law requires that certain basic procedures be provided to protect the rights of individuals. These protections include a right to be present; to be heard; to be heard by impartial persons; and to have a decision with reasons, made by the persons hearing the evidence. Where hearing boards only make recommendations, these basic procedural protections do not apply. This can lead to board practices being instituted that result in the public losing confidence in the hearing board and its process.

The EAA hearing process will remedy some of the problems noted above. It will likely authorize hearings for a larger variety of land use activities and its hearing board will be a decision-making body. However, certain key land use activities have already been exempted from the application of the Act by regulations not involving prior public consultation. These activities include construction of agricultural outlet drainage schemes and new townsites.

Advisory committees of citizens, special groups etc. can provide expertise to local decision makers on land use water quality implications of development proposals. The role of the Waterloo Regional Ecological and Environmental Advisory Committee in Ontario is recognized in the regional official plan which gives the committee's activities greater local legitimacy.

Citizen groups have utilized the courts, both to prosecute violators of environmental legislation and to seek injunctions halting particular activities where government agencies, for whatever reasons, have failed to act.

Citizens may prosecute violators of legislation unless that common law right has been altered by the particular legislation sought to be invoked. Most Ontario environmental legislation does not interfere with that common law right. However, The Mining Act, The Pits and Quarries Control Act and The Beach Protection Act, all administered by MNR, have eliminated the citizen's right to prosecute violations under those statutes.

Private prosecutions, though occasional, can be instructive. For example, a citizen recently successfully prosecuted a waste disposal site operator for permitting leachate and untreated drainage to enter a watercourse contrary to provincial regulations. The prosecution followed the operator's failure to comply with MOE recommendations to improve the operation of his site.

A private prosecution may stimulate a higher public profile for those prosecuted, as well as for the relevant administrative agency. Fines levied, however, may frequently be an insufficient economic deterrent to the convicted. Moreover, one may only obtain a fine with a private prosecution, not an injunction, to stop unlawful activity. Frequently, under a private prosecution, unlawful activity continues while charges are being processed through the courts.

While private prosecutions are limited in their effect, injunctive actions and judicial review by citizens may provide a valuable supplement in halting potentially harmful activity. Experience in Ontario, however, suggests that several barriers exist to citizen's groups effectively using these injunctive and related remedies. These barriers include standing, discretionary agency powers, and costs.

Traditional arguments raised to such "citizen suit" or right of action statutes include suggestions that laws of this type would be burdensome to the economy; clog the courts with numerous frivolous lawsuits; and be excessively disruptive of the administrative control process itself.

However, experience with such statutes in a number of basin states, including Michigan and Minnesota, suggests the contrary. Observors of the use of the Michigan statute from 1970 to 1976 have concluded that where necessary it has been turned to as a vehicle for expeditiously resolving environmental disputes; and utilized by administrators who themselves seek to supplement their traditional regulatory powers. Moreover, it has not resulted in a flooding of the courts. It was found, for example, that from October 1, 1970 to July 1, 1975, 103 circuit court cases were initiated under the Michigan Act. During the same period, approximately, 615,700 civil cases were commenced in circuit courts in the state. By any yardstick this is hardly a flood.

Similarly, a 1973 Consumer Interest Foundation study of whether citizen suits burden state courts elicited some of the following comments from officials in states with such laws:

Minnesota

"It would not appear that an unreasonable burden has been placed on our judicial system to date". (J.H. Morgan, Deputy Attorney General)

Massachusetts

"I can categorically state that the idea that there would be a flood of cases is a myth that has been exploded". (G. McGregor, Assistant Attorney General)

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